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OF THE

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UNIVERSITY OF CALCUTTA
REGISTRARS OF BOOKS

"It will flourish, if naturalists, chemists, antiquaries, philologers, and men of science, in different parts of *Asia* will commit their observations to writing, and send them to the Asiatic Society at Calcutta It will languish if such communications shall be long intermitted; and it will die away if they shall entirely cease."—SIR WM. JONES.

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ADDENDUM.

After the title of the paper on the Zinc Mines of Jawar, published in the last volume (page 212 et seq.) add the words—*Communicated by the Agricultural and Horticultural Society of India.*

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JOURNAL

OF THE

ASIATIC SOCIETY.

No. I.—1851.

Detailed Report on the Copper Ores of the Deoghur Mines.—*By* H. Piddington, *Curator, Museum Economic Geology.*

Discovery of the Ore.

From Captain W. S. Sherwill, *Revenue Surveyor.*

To Captain H. L. Thuillier, *Deputy Surveyor General.*

Camp, Zillah Bhaugulpoor, 31st January, 1850.

Sir,—During the present month, and whilst engaged surveying Zillahs Beerbhoom and Bhaugulpoor, I was requested by Mr. Vincent, Deputy Magistrate of Deoghur, to visit and give my opinion upon a vein of copper that had a few months previously been accidentally discovered by a native and by him reported to Mr. Vincent.

2. Deoghur or Byjnath is a small Town in Zillah Beerbhoom, famous for its appearance, the inhabitants chiefly Brahmins.

The Town is situated on the great primitive Table-land which extends from near Burdwan to the Dunna Ghat in Behar, and which is composed of granite, gneiss, serpentine, greenstone, quartz, rock, &c., the gneiss strata are much contorted, often vertical, generally inclined and abundantly traversed by greenstone dykes. The appearance of the country is pleasing, the land is undulating, well wooded and studded with detached hills of rounded masses of garnetiferous gneiss. The spot where the copper is found is situated in the lands of the village of Byrúki of Tuppeh Deoghur, Saruth of Zillah Beerbhoom, and about one mile from the common boundary of Zillahs Beerbhoom and Bhaugulpoor; 8 miles N. W. from Deoghur or Byjnath, and on the watershed of the high land of Beerbhoom; the streams which flow to the

South falling into the Hooghly, those flowing to the North falling into the Ganges; it is situated in a dense jungle of Asun, Sakúá, Dhow, Kuchnar, Keud, Jámun, Aonlá, Kusmúbhá, Chirownjee, and is on the fork or junction of two small mountain torrents, which discharge their waters into the Chandun river, a tributary to the Ganges, which discharges itself into the Ganges near Bhaugulpoor; these torrents and the Chandun river are mere dry sandy channels during the cold and hot weather.

3. The occasion of the copper being brought to light was the hill men bringing in to Mr. Vincent, small pieces of a bright green species of waterworn felspar, which at once showed the existence of the ore. The ground in the immediate neighbourhood of the ore is pretty freely strewed with green felspar, and with weather and waterworn fragments of the ore embedded in the felspar. The immediate superficial soil is composed of quartz, felspar, hornblende, fragments of gneiss, black mica, silvery mica and shorl. The surface veins run East and West, and present the ore in irregular masses of $\frac{3}{8}$ of an inch broad, so much corroded by atmospherical influence as to appear as a soft friable red, yellow, liver-coloured or garnet-coloured earth, but upon digging a couple of feet below the surface of the country, the veins become a compact liver-coloured mass, spangled with shining particles of copper; the whole enclosed in a soft friable apple-green, yellow or white felspathic rock. Traversing the copper from North to South small veins of lead appear, which occasionally form the containing walls to the copper. I traced the vein of copper for about 100 feet East and West and dug to the depth of two feet only. I have smelted with the aid of coal, dug from the Banslee Kullah in the Rajmuhal hills, some of the ore, which has given a return of 30 per cent. of good copper; inferior specimens, mostly waterworn pieces, picked up on the surface, gave 25 per cent. I have sent a large amount of the specimens, together with the smelted ore, to Mr. Piddington, Curator to the Geological Museum attached to the Asiatic Society, and have requested that gentleman to furnish you with a detailed account of its value, purity, &c. and which will form an addendum to this report; Mr. Piddington from his ability to do justice to the subject, and from his willingness to assist in such matters will, I am sure, supply you with his report. A copy of this report has been sent to Mr. Piddington.

4. In April, 1849, Mr. Vincent forwarded specimens and reported the circumstance of the existence of the copper ore to the Magistrate of Beerbhoom, but no notice has been taken of his report.

5. The nearest coal to the spot is at Kurkurbali, 40 miles S. W. in Pergunnah Kurruckdiha in Zillah Hazareebagh; coal is also found 57 miles in a South-easterly direction in the Rajmuhal hills.

6. Believing this to be a valuable discovery I lose no time in bringing it to your notice in the hope that you will bring it to the notice of Government; any further information relative to the spot or roads leading to it will be cheerfully supplied upon application being made to me.

(Signed) W. S. SHERWILL.

It may be proper, especially in reference to certain insinuations, which I refrain from qualifying, made at the July meeting of the Asiatic Society regarding the Museum of Economic Geology, to preface this report with the following letter; to explain alike the nature of the researches of which this paper contains the results, and the reasons why some notice of them was not earlier given. It may yet be, as every scientific Geologist and Mineralogist will understand, that the discoveries announced in it are connected with great questions of public revenue and unknown resources which we possess in India, and in the due execution of the trust imposed upon me as a servant of Government, it was necessary that the information this letter conveys should be in the hands of Government at the earliest period. Those who are acquainted with the difficulties of researches of this kind in India, and who feel with me what is due to the high standing of the Society's Journal will I trust find that nothing has been lost by a little delay.

SECRET SERVICE.

From H. PIDDINGTON, *Curator Museum Economic Geology.*

To SETON KARR, Esq., *Under Secy. to the Government of Bengal.*

SIR,—I am greatly averse to making any incomplete report on scientific matters, but learning from some conversation with Captain Thuillier that much speculation has been excited by the reports which were published by Government a short time ago regarding the recently discovered Deoghur Copper mines, and that some applications have been, or will be made to Government on the subject of them, I deem it right (though I originally intended to wait as I shall subsequently explain, until I could complete my investigation) to make the present report;

which I request may be deemed only a preliminary one, and made as a matter of duty that Government may be properly informed.

2. You will doubtless have remarked, Sir, in the report of Captain Sherwill to Captain Thuillier, that the former officer states that he had sent me a box of the ores, and I found upon the close mineralogical examination which such specimens require, that there was a considerable number of varieties, all of which had to be carefully classed and tested before their nature could be duly pronounced upon; many of them very small, and requiring to be repeatedly examined. To be brief, I may say that I have been most assiduously employed with them to enable me to give a complete report and that I have performed upwards of 150 examinations more or less complex upon about 20 species and varieties of these ores and their matrix, and that I am yet pursuing these, and have to repeat some when I can obtain more specimens before I feel safely assured of my results. You are, Sir, no doubt aware of the patient and vigilant research which such matters require that nothing may be passed over.

3. The results then so far as I can yet pronounce with safety is first that (8) eight of these ores contain more or less of silver, some of them traces only; others a promising proportion, but no estimate of the quantity can be made till good supplies of the ores are obtained. Mr. Dodd has, I observe, stated that the lead ore contains about 50 oz. of silver to the ton, in his report.

4. Next I had requested Captain Sherwill always to send down *all* that was about, or near to, any thing he thought of value, and this he has faithfully done on this occasion, and amongst the mere rubbish I have had the satisfaction to discover what I have been in fact looking to find for some twenty years in India and which I have examined perhaps 50 or 100 specimens from various parts of India in hopes of meeting with, but hitherto without success, till I have at length found it in the rubbish, or what the Cornish miners would call the *Gossan* of the Deoghur mines. I some years ago in the Journal of the Asiatic Society Vol. IX. p. 1144 in my report on the Museum of Economic Geology, then about to be established, announced that this mineral probably existed in India in the following words.

"I mention particularly here, the Mexican and Peruvian silver ores, because some of them would from their earthy appearance, and the

small proportion of metal they contain be passed by as mere red earthy soils or iron ores, which in fact they are; some of these ores form the staples of many of the great mines of Mexico and Peru, and it may be possible, that we have also deposits of these ores on the flanks of the Western Ghauts; or in other situations of which the geological features approach to those of South America though upon a smaller scale."

The object of this notice was to draw public attention to the ores called *Pacos*, *Colorados* and *Negros*, especially the two first, which so much resemble rotten iron stones, or earthy iron ore, that none but those who know them would suppose they contain silver. The following extract from Jameson's Mineralogy, p. 75, describes the ore.

"In some parts of Mexico, however, as we are informed by M. Humboldt, the operations of the miner are directed to a mixture of ochry brown iron ore, and minutely disseminated native silver. This ochreous mixture, which is named *Pacos* in Peru, is the object of considerable operations at the mine of Angangues in the intendancy of Valladolid as well as of Yxtepexi, in the province of Oaxaca."

5. As before stated there are amongst the Deoghur ores some small but unequivocal specimens of the *Pacos*, and I have in the Museum of Economic Geology, from my own collections, a fine series of the true Peruvian ores to compare with.*

6. I am in active correspondence with Captain Sherwill on this subject, and he informs me Mr. Vincent will proceed again shortly to the mines to obtain more specimens according to directions and specimens for guidance, which I shall forward.

7. It does not of course follow from this that the Deoghur mine is one of silver, or rich in silver, or worth working even if it was a silver mine: but on the other hand there may be rich deposits of ore near these indications; and the mere fact of the discovery of a *Pacos* in India is one of high mineralogical importance, since it may also exist elsewhere in greater abundance; but I have deemed it right that His Honor should be in early possession of the knowledge of it should any proposals come before Government relating to this property.

I have the honor to be, Sir, Your Obedient Servant,

H. PIDDINGTON,

Museum, 3rd July, 1850. *Curator Museum Economical Geology.*

* These contain Copper as well as iron and so do those of Deoghur.

From H. PIDDINGTON, *Curator Museum of Economic Geology, To* W. SETON KARR, Esq., *Under Secretary to the Government of Bengal.*

SIR,—In continuation of my Secret Service letter of 3rd July, I have now the honor to submit for the information of Government a detailed report on such of the ores of the Deoghur mines as have reached me.

His Honor will be satisfied to see that from two of the classes of ores, of which only I could obtain a sufficient quantity for the experiment, the produce in silver has been a fair and a good average; though these are still but surface specimens, and that moreover (and upon this depends their value) the Spanish American process of amalgamation can be successfully practised at what may be supposed theoretically the very worst period of the year in India.

We have now to hope that the deposits, if wrought, will be found abundant.

(Signed) H. PIDDINGTON,
Curator Museum Economical Geology.

Calcutta, 31st December, 1850.

REPORT.

PART I.—THE ROCKS.

In forwarding these specimens Captain Sherwill has sent also specimens of the rocks in which the vein lies, and to avoid confusion I briefly describe these separately from the ores.

No. 1. *A garnetiferous gneiss* with horizontal veins of quartz passing through it, *forms the general bed of the country at Deoghur.**

No. 2. Gneiss with thin veins of quartz, no garnets.

No. 3. Decomposing pegmatite, forming the gangue in which the metallic veins are found; *3a. 3b. 3c.* coarse granular pegmatite *found on the surface of the country and contains the ores:* It is all more or less decomposing.

No. 4. Altered quartz rock, in some places nearly a jasper, and stained green by copper infiltrations.

* These passages in Italics are Captain Sherwill's Notes.

No. 5. Schorly granite, or schorl rock of Cornwall, (See Boase, Primary Geology, p. 16,) schorl and quartz in distinct grains and imperfect crystals.

No. 6. Garnet rock, or garnetiferous quartz rock according to McCulloch (p. 326), who makes one of his subdivisions of quartz rock to be a granular quartz containing but little felspar, as in our specimen, in which it can be scarcely distinguished. Not an atom of mica is to be seen, but the garnets, (some small ones being semi-crystallized,) are abundant, and it might, so far as the presence of three ingredients is necessary to constitute a granite, be called a garnet granite.

No. 7.* Compact pegmatite with veins of massive pistacite epidote.

No. 8. White and flesh-red felspar with nests and veins of acicular crystallized epidote (pistacite) of a bright pale green.

Part II.—The ores and their description.

After a most minute and careful examination as above described in my letter, I class the ores as follows :

1st Group. Variegated copper ores, called Peacock ores by the miners.	Bright Peacock ore.	A.	
	Dull Peacock.	B.	
	Marbled Peacock with a pale greenish *gossan*.†	C.	contains silver.
2nd Group. Grey Coppers.	Dull Massive Grey Copper.	D.	Silver.
	Bright Grey Copper.	E.	
3rd Group. Red ores. The *Pacos* and *Colorados* of Peru and Mexico.	Bright brick red *Pacos*.	F.	Silver.
	Dull, pale red, to liver-coloured *Pacos*.	G.	Silver.
	Dark hard veins resembling Tile-ore with soft shining black specks and veins in it.	H.	Silver.
4th Group. Green ore.	Bluish green, earthy carbonates of copper, with bright red specks.	I.	Silver.
5th Group. Galenas.	Bright large-grained Galenas.	J.	
	Cupro-Plumbite, an ore of copper and lead, in diagonally lamellar veins.	K.	

* This is No. 12 of Captain Sherwill's list where it follows the ores.

† Two small nodular specimens of this variety, of a dark earthy liver-coloured aspect, seem richer than the rest, but I have only these as yet and cannot spare them for a quantitative analysis.

These ores and their constituents may be described as follows :—

A.

The Bright Peacock ores.

This is the well known variegated vitreous copper ore of mineralogists, which contains from 50 to 70 per cent. of copper. Our specimens are in thin veins, of which the thickest is $\frac{5}{8}$ (five eighths) of an inch thick, but as some specimens appear to contain a larger proportion of the poor yellow sulphuret, not more than 30 or 40 per cent. should be expected from this ore in practice. It contains no silver.

B.

Dull Peacock. This is a more ferruginous and earthy variety of the former ore, and of course would give less copper. It is indeed scarcely worth making a variety of. It contains no silver.

C.

Marbled Peacock ore. This is a variety which occurs marbled with green and red earthy mixtures. It runs (either at the termination of the vein or at the surface ?) to a pale earthy *gossan*. It seems to contain a promising proportion of silver.

SECOND GROUP, FAHLERZEN, OR GREY COPPER.

D.

Dull massive Grey Copper.

This may be described a dull grey, greenish grey, and liver-coloured Fahlerz, the grey varieties sometimes shining with a micaceous or silvery lustre on the fresh fracture, the liver-coloured ones slightly micaceous also on the fracture but of a reddish-colour on the weathered or old surfaces. It is a true Fahlerz as to appearance, but I found it to contain, on an average from the pound taken for amalgamation of the grey and liver-coloured sorts together, in 100 parts.

Sulphur and a little water,	12.55
Earthy silicates,	33.85
Peroxide of iron,	8.33
Lead,	10.00
Copper,	32.70
Silver,	0.17
	97.60
Loss,	2.40
	100.00

There is no trace of antimony in this mineral, and it thus forms a distinct lead Fahlerz! which I do not find any where described; the latest authority, Nicol (p. 490), appears to think lead an accidental occurrence. Before the blow-pipe in an open tube it blackens and gives an acid water, but no sublimate. On charcoal it gives no fumes nor any deposit but is converted without ebullition into a black cindery slag which with soda gives a pale metallic copper mixed with lead. If the heat is long continued the lead of course disappears and the copper alone remains.

This ore was one of those of which I could collect enough for an amalgamation by the Mexican process, and as will be seen in the sequel it gave a very good product.

E.

Bright Grey Copper.

This is a grey copper, a Fahlerz with some lead but no silver. It is massive, with a steel-grained fracture, and brittle, but the latter portions are hard to pound; with green and yellow marblings and stains, it passes into a green and yellow earthy *gossan*.

3rd Group, Red Ores.

F.

Bright, brick-red Pacos, or Colorados.

This ore exactly resembles the museum specimens of Peruvian *Pacos* from my own collections, that is, an earthy iron ore. I collected a sufficiency of this ore to subject a pound troy of it to a proper Mexican amalgamation process, of which the results will be described in Part III.

The composition of an average lot taken from that used for amalgamation was as follows:—

Water, sulphur and carbonic acid,*	14.30	
Silver, ...	0.21	
Iron, peroxide, ...	15.40	
Copper, peroxide, ...	27.20	=21. 8 copper.
Sulphur, ...	10.45	
Earthy silicates, ...	32.45	
	100.01	

It is thus a tile copper ore, with a minute portion of silver.

* Some of the Copper appears to be in the state of Carbonate.

G.

A dull, pale red, and liver-coloured Pacos.

This ore also contains silver, and two small nodular specimens of a dark earthy liver-coloured aspect, seem richer than the rest, but I have as yet only these two bits, and indeed not much of any of this kind.

H.

Dark hard veins of a red tile-copper ore, with black shining specks and veins of protoxide of iron. This ore contains some silver but we have but very little of it, and I can only roughly estimate it by a guess at about two-thirds the value of F.

5TH GROUP, GALENAS.

J.

Bright large-grained Galena, no silver.

K.

Cupro-Plumbite (Breithaupt).

This is another Peruvian ore which we have unexpectedly found. It may be described as massive, in very thin veins, forming alternate streaks of a bright and dull, dark, blue-grey, galena-like mineral; the streaks lying diagonally across the small veins; sometimes in larger glancing masses, and at others in thin needle-like streaks. I have not found any silver in it, though Breithaupt gives it 0.5 per cent. Before the blow-pipe, in the open tube, it fuses and gives acid fumes.

On charcoal it melts, swells up, and boils, sending out a rapid stream of dull sparks if brought too near the reducing flame. Finally it gives a globule of lead which contains copper but no silver.

Our specimens are all in such very thin veins that a quantitative analysis would always give uncertain results, owing to the matrix. I have therefore preferred to wait till we obtain larger masses with some new supply.

PART III.—AMALGAMATION ASSAYS.

I thought it of much importance that we should ascertain if, with the high temperature and great moisture prevailing here during most part of the year, the Mexican amalgamation process could be successfully used for the extraction of the minute portions of silver which

these ores contain, and by which only they can be wrought to profit,* and having obtained a supply, though rather limited in quantity, I first most carefully picked and sorted the ores, and obtained a pound troy weight of two of them, from which the following experiments were made, after some preliminary trials of which it is unnecessary *here* to give particulars; being, though tedious, only those which all laboratory work requires before an experiment for publication is made.

Amalgamation I.

The first was the ore F. a bright brick-red Pacos.

One pound troy was carefully reduced to a fine powder, and salt and *magistral*† added, in larger proportions than usual on the large scale, in a large mortar, and on subsequent days the mercury was duly added, but also in larger proportions, to insure the successful extraction of all the silver.

The mass was worked over every two days by the pestle, and kept at the proper degree of moisture. On the twenty-fourth day it was carefully washed off, and the mercury driven off by heat; and though there was some small loss from ebullition of the mercury in the crucible, and some also in washing such small quantities, as I ascertained by experiment, yet I had the satisfaction of obtaining 5 grs. of pure silver from the pound troy; which for the *Caxon* of 5000 pounds Avoirdupois would give somewhat better than $8\frac{1}{4}$ marcs of silver to the *Caxon;* and ores are sometimes wrought in Mexico and Peru of 2 and $2\frac{1}{2}$ marcs when quicksilver is cheap: Ores which give above six marcs being called good metal. The highest specimen we have in the museum is marked as giving 500 marcs and the lowest 20; but all those so valued are sulphurets; none of the *Pacos,* unfortunately, are valued.

Amalgamation, No. II.

The second trial by amalgamation was with the specimen D, the dark liver-coloured Fahlerz, the only one, besides the above, of which I could obtain a troy pound weight. The process was of course the same, but, though the weather was cooler, only 20 days were allowed

* All attempts to introduce the German and other amalgamation processes in Mexico have been failures with the poorer ores which form the riches of the great Mexican mines; and this error was in great part the ruin of the Mining Companies from England.

† Roasted sulphuret of Copper.

to this experiment; and I think 15 might have sufficed, but my first object was to prove the perfect practicability of the Spanish American processes with various ores, and to ascertain the full quantity of silver without reference to the expenditure of the ingredients, which on so small a scale were necessarily used in larger quantities, or of the time, which can only be definitely settled by large experiments also. The result of this trial too was highly favourable, as somewhat more than 8 grs. of pure silver were obtained; but taking the produce at 8 grs. this would be for the *Caxon* of 5000 pounds Avoirdupois, as before, 13.5 marcs, and thus above an average ore.

It will be observed that I have used the Cornish term *gossan* when speaking of some of these ores, to designate the instances in which the copper ores run into a pale red, earthy ore, which is in fact (as in C.) a *Pacos*, as it contains a portion of silver. This word *gossan* is a term used by the Cornish miners to distinguish exactly an earthy, friable, ferrugino-cupreous earth, which appearing at the surface is held to be an indication of copper below. It is in fact a copper *Pacos*, but contains no silver, and it does not, that I am aware, as some of our specimens do, shew itself to be a separate mineral by running in a distinct vein at right angles into, and altering the copper vein where it meets it. Cornish *gossan* is also friable and full of hollows, like ore in a state of decomposition, which it is generally supposed to be; ours more resembles a high-coloured but soft brick, except in H. which might be taken for a red iron ore.

As a good *gossan* in Cornwall is taken to be an indication of a good copper vein, so the *Pacos* in Peru, and the *Colorados* in Mexico, (being the same mineral) are held to be good indications of silver below; and it is said too that it is rarely found to run deep, that is, not above 50 or 100 fathoms, changing then to richer ores. Whether this be the case at Deoghur, time and enterprize can only shew us. From analogy one would say there may be something worth sinking a small shaft for, and tracing how far the veins extend on the surface; and if they crop out at any other part. The Copper and Cupro-Plumbite (K.) may be well worth exportation in their raw state, when simply dressed and picked with care.

In a geological and mineralogical point of view the discovery of these ores in a country yet so little known to us holds out some hope

that we are only yet at the threshold of what we have still to find; but it will be the first successful working of a mine which will stimulate speculation in that branch of industry, and I have spared, and shall spare no trouble to assist it, so far as the resources of the museum extend.

H. PIDDINGTON,
Curator Museum Economic Geology.

Calcutta, 31st December, 1850.

No. 48.

From the Under Secretary to the Government of Bengal,
To H. PIDDINGTON, *Esq., Curator Museum Economic Geology.*
Dated, Fort William, 8th January, 1851.

SIR,—I am directed by the Deputy Governor of Bengal to acknowledge the receipt of your letters dated the 3d July last and 31st ultimo, and to state that His Honor has perused with interest your reports on the qualities of the ores from the Deoghur Mines in the Zillah of Beerbhoom.

(Signed) W. SETON KARR,
Under Secretary to the Government of Bengal.

(True Copy,)

H. PIDDINGTON,
Curator Museum Economic Geology.

A Twentieth Memoir on the Law of Storms in the Indian and China Seas, being the APRIL CYCLONE *of the Bay of Bengal; 23rd to 28th April,* 1850.—*By* HENRY PIDDINGTON, *President of Marine Courts.*

In April, 1850, the Eastern quadrants of a Cyclone passed over Calcutta which, there was no doubt, had been a severe one at sea and in other parts on shore; and which I so announced in the papers, and I have been diligently employed since that time in collecting the documents necessary for its investigation, some of which only reached me lately from England. The present Memoir is the result of my labours, and it will I hope be found worthy of its predecessors, tracing as it does a severe, and at times a furious, Cyclone for a course of a

thousand miles, from near the Nicobar Islands to Moorshedabad; and affording us some valuable lessons as to parallel Cyclones and the dependence to be placed on the Barometer. It also adds an important page to our history of the tracks of storms in the latitudes between Acheen Head and the Andaman Islands.

The same arrangement has been preserved in this Memoir as in the preceding ones. The documents are first given and then tables of the winds and weather for each day all over the Chart. This is followed by a summary, shewing the grounds on which the position of the daily Centres are given and comprising such other results as are thought worth notice.

Abridged Log of the Barque IRON GEM, *Capt.* GOOD, *from North Shields, bound to Calcutta. Civil Time.*

At noon 22nd April, 1850.—The *Iron Gem* was in Lat. 6° 47′ N.; Long. 87° 49′ East with winds about at (7 and 6,)* variable from N. W. Ship standing to the Northward. Cloudy weather. P. M. blowing fresh in heavy squalls from N. N. W. to midnight. 11 P. M. the main piece of the rudder broke off by a heavy blow of a sea.

23rd April.—Weather rather moderating from 4 to 8 A. M. after which as bad or worse than before, with heavy blinding squalls and sheets of rain. Wind N. W. to N. N. W.; at noon from (7 to 8;) Lat. Acct. 6° 40′ N.; Long. 88° 25′ East. P. M. increasing to (9,) with terrific squalls. Wind to W. N. W. Ship hove to.

24th April.—Wind veering to N. W. b. W. and Westerly. Very heavy squalls. Ship lying to. Noon Lat. 6° 37′ North; Long. 88° 40′ E. P. M. wind West, decreasing from (9,) at noon, to (4) at 7. P. M.

25th April.—A. M. out second reefs. Noon Lat. Obs. 6° 51′; Long. 88° 52′. Wind West from (9) to 3 at noon.

Abridged Log of the Ship COWASJEE FAMILY, *Capt.* DURHAM, *from Singapore towards Calcutta. Civil Time.*

The *Cowasjee Family* passed Point Pedir at noon on the 19th April. On the 20th and 21st, she had light Southerly and S. Westerly breezes.

On the 22nd April.—The wind veered from S. b. E. to Easterly, and at noon was N. b. E., when Lat. 9° 21′ North Long. 90° 03′ East. P. M. moderate breezes E. N. E.; and at 6 P. M. to midnight N. E. with squalls at times, ship standing to the N. N. W.

* Admiral Beaufort's Numbers.

23rd April.—A. M. Squally. Noon, strong N. E. breeze with dark gloomy weather. Lat. Acct. 11° 45′ N.; Long. Chr. 88° 24′; Simpiesometer 8 A. M. 29.76; noon 29.76. P. M. fresh breeze N. Easterly, with hard squalls moderating at 9 and increasing again at midnight with constant rain; ship standing to the N. W. with all preparations made for bad weather.

24th April.—To 4 A. M. wind N. E.; at 6, N. N. E.; at 10, North to noon. Increasing from a hard gale to "a perfect hurricane"* at 9.30 A. M., when ship lying to very badly, bore up and scudded S. S. W.; wind North, ship under bare poles "blowing an unadulterated hurricane." At noon the same, with a great deal of thunder, sails blowing from the yards. Position not given. Simpiesometer at 29.58, "but it does not appear to act at all." P. M. hurricane and dreadful thunder with constant deluges of rain. Ship running 9 knots to the S. b. E. ½ East; wind now N. b. W.; at 3, N. N. W.; at 5, N. W. b. N.; at 8, N. W.; and at midnight W. N. W. At 8 P. M. weather moderating. "*We fancy the centre of the hurricane is now past us.*" Midnight decreasing with a high sea from the Northward.

25th April.—A. M. moderating and clearing up "*having now run out of the storm circle*" wore ship to stand on her course. Noon wind W. S. W. could not carry much sail on account of the very heavy confused sea, mostly from the Northward. Lat. Obs. 9° 45′ N.; Long. Chr. 87° 10′ East, having experienced 78 miles of storm current to the South. P. M. moderate W. S. W. monsoon, but heavy sea from the Northward; exchanged Nos. with the ship *Duke of Wellington* who signalised "A gale is coming on, I think; we have had a very heavy sea from the Northward." To midnight the same. Ship making 5½ knots to the North with the same swell.

26th April.—To noon, when in Lat. 11° 54′ N.; Long. 87° 05′ East. A brisk monsoon and clear weather, ship making 7 knots, but the heavy confused sea is still complained of and it continues to noon of the—

27th April.—When the ship is in Lat. 13° 45′ North; Long. 87° 22′ East.

Abridged Log of the Brig Nereid, *Capt.* Escott, *from Akyab bound to Antwerp. Civil Time.*

I print, nearly entire, the summary of this very able log as sent me by Capt. Escott. The italics are mine.

The *Nereid* left Akyab, April 18th, and carried light winds Westerly and N. W. with fine weather until 23rd being then only in 16° 10′ N. and 90° 11′ E.; Bar. 29.85; Ther. 87°.

24th April.—Light winds N. N. E. throughout (3-4 c. o.)† Sun obscured. Acct. 14.50 N.; 89.20 E.; Bar. 29.80; Ther. 87°. Slight rain. P. M. light baffling

* These words between commas are copied literally from the Log.

† Admiral Beaufort's figures and letters.

winds shifting suddenly from all quarters. Thick rain t. and l. 1 P. M. breeze settled at N. E. increasing gradually. At 4 P. M. N. N. E.; 5, Bar. 29.75 o. r. t. l. In small sails, and prepared for bad weather. At 8 P. M. N. N. E.; At 8, Bar. 29.65 q. r. Running S. S. W. 8 k. midnight steady at N. N. E. gradually increasing. (9). Sea rising fast, 29.58, q. r. steering S. S. W. since noon 88′ miles.

25th April.—3 A. M. N. N. E.; (9) Barometer steadily falling r. q. Sea high but regular: Bar. 29.41. Close reefed main topsail; furled foresail and scudded S. S. W. under the close reefed main topsail and reefed foresail; 8 knots. 4 A. M. veering N. E. and back again to N. N. E. Same weather and a heavy sea; 29.35; wind N. N. E. (10.) 5 A. M. N. N. E. blowing in heavy gusts. At 10h 29.30; shipped a sea on main deck, knocking bulwarks away and breaking adrift water-cask spars and launch. Ship labouring heavily. Hauled foresail up, and lay ship to until we got launch and spars secured again; most of the water casks were either washed overboard or stove to prevent injury to the main deck stancheons and splitting the covering boards open. At 6 A. M. N. N. E.; 11h 29.28; at 8, 29.28 North; (11,) r. o. q.; at 8 A. M. being all secured again and finding the gale increasing, "*knowing myself to be in front of the approaching centre* bore away again under close reefed main topsail and fore-topmast stay sail right before it, making about South course. At 10 A. M. N. N. W.; (11) Bar. 29.28; At 11, N. W. by W.; (10,) 29.30 q. r. o. Noon heavy gale at W. N. W. with heavier squalls, more violent and at shorter intervals. Expecting to see the main topsail go to pieces every moment. Bar. 29.30 (rising) r. o. q. Sun obscured all day. Lat. by Acct. 12° 40′ N.; Long. by Acct. 88° 27′ E.; Ther. 84°. P. M. begins with a hard gale; (10,) and a mountainous sea running. Fore-topmast stay sail blew away; bent a new one; at 4 P. M. apparently moderating, wind now W. by N.; (9,) squalls less violent; Bar. 29.45 c. q.; at 6, wind West; (8,) weather gradually moderating and the clouds breaking up in large openings and clear intervals, having previously been perfectly overcast all round. Set reefed fore-sail and treble-reefed fore-topsail. At 8, still clearing away, stars now visible. Bar. 29.60; wind W. S. W.; at 8, c. Midnight fresh gales and cloudy with a high sea. Wind W. S. W.; (7,) 29.63.

26th April.—Still becoming gradually moderate and fine, wind S. W.; (6,) set jib, mainsail, &c. 29.65; 8 A. M. wind moderating with clear weather, wind S. W.; (5,) 29.67; made sail accordingly. Noon fresh breezes with clear weather, wind S. W.; 29.70; Ther. 87°; Lat. Obs. 11° 37′ N.; Long. Obs. 88° 59′ E.

Memorandum.—I have endeavoured to describe the weather and the strength of the wind by Capt. Beaufort's system with which you are doubtless well acquainted and trust I have made it sufficiently intelligible. I should not omit to remark that on the evening of the 24th, the *Eastern* horizon for some 15° in

altitude was varied by that bright scarlet tinge seen Westward at sunset. This continued from sunset until nearly 9 P. M. During that night much lightning to the Southward and S. Eastward. Also on the 25th, P. M. as per log much heavy thunder and lightning, but none was observed after the gale set in heavy.

Many Boobies and other sea birds, King Fishers and Dragon Flies, were about the ship on the evening of the 25th. Did not experience any remarkable swell previous to the setting in of the breeze.

By a diagram which I made the day after, I consider the storm progressing to N. W. b. W. or perhaps more Westerly, about 7½ knots per hour.

Abridged Extracts from the private Memorandum Book of Capt.* THOMSON, *Ship* ENEAS, *from Calcutta bound to Mauritius. Civil Time.*

The *Eneas* had on the 22nd light variable airs from W. N. W. with hot sultry weather, and at noon was in Lat. 19° 55′ N.; Long. 90° 24′ East; Bar. 29.90; Ther. 86°. To midnight the same weather.

23*rd April.*—A. M. light airs N. E. very fine *and smooth water.* Noon, Lat. 15° 49′; Long. 91° 01′ East; Bar. 29.80; Ther. 86°; a current of 35 miles to the Eastward. A moderate breeze from North to N. E. becoming unsettled, from N. E. to S. East; cloudy.

24*th April.*—A. M. cloudy and lightning to the S. E. during the night. Constant heavy rain with unsettled weather and heavy swell. Lat. Acct. 14° 00′ N.; Long. 90° 38′ East; current allowed for; Bar. 29.70; Ther. 81°. P. M. increasing breeze at N. N. E.; from noon till 8 P. M. steered S. S. W.; at 8, S. W. Making all preparations for bad weather. Bar. at 3 P. M. 29.60; at 4 P. M. 29.50; at 6, 29.40; at 8, 29.38; at 10, 29.38; and at midnight 29.40; wind at midnight marked as a "moderate gale."

25*th April.*—At 2 A. M. sea rising very suddenly to a fearful height; too much sea to heave to; sails, both set and furled, blown from the yards, though the last were well secured. A kind of *hard sleet almost cutting the skin.* Wind unsteady with heavy gusts ending at S. East. Barometer at 2 A. M. 29.40; from which time it could no longer be seen in the ship's distress. At 2.30 A. M. two of the between deck ports were stove in and the vessel was nearly swamped with the quantity of water on her main deck. Ship on her beam ends and cabins boats and everything moveable washed away; ship settling down, cut away the main and foremasts, all hands baling and pumping and clearing wreck. Noon, weather still very heavy, wind South East decreasing with less sea to midnight.

* In the distress and swamping arising from the ship's between deck ports having been beaten in, her log-book was destroyed.

26th April.—Fine. Clearing wreck, heaving cargo overboard, and fitting jurymasts and sails. Ship drifted about 13 miles to the N. N. E.

27th April.—Noon, Lat. Obs. 12° 47′ N.; Long. 88° 47′ East; clearing wreck and rigging jurymasts.

Abridged Log of the Ship Atiet Rohoman, *Capt.* Burn, *from Calcutta to Mauritius. Civil Time.*

23rd April.—At Noon, Lat. 17° 6′ North; Long. 88° 54′ East. P. M. to midnight, light airs from North to E. N. E. and gloomy weather.

24th April.—To Noon the same weather, wind light at N. E. Lat. Acct. 16° 25′ N.; Long. 87° 54′ East. Sunset breeze increasing from N. E. to 6 knots. Ship steering to the S. W. b. S.; at 8, Bar. 29.75; midnight fresh breeze, the same; Bar. 29.75.

25th April.—To Noon breeze increasing from N. E. b. N. with squalls and rain; at 8 A. M. all preparations for bad weather and hove to. Noon heavy gusts, Bar. from 29.75; at 4 A. M. to 29.57 at Noon. Wind veering occasionally to N. b. E. and N. ½ E.* but for no length of time. Position as estimated by Capt. Burn at Noon Lat. 14° 24′; Long. 85° 38′ East; P. M. Bar. 29.55 to 5 P. M. when gradually rising to 29.60 at Midnight. Wind N. N. E.; at 1 P. M. North; at 4, N. N. W.; at 6, N. West; at 8, when she bore up N. W.; N. W. b. W. at 9, and W. N. W. at 11 P. M. Midnight gale decreasing and fine.

26th April.—Fine breeze from West and W. b. N. Lat. at Noon 12° 49′ N. Long. 85° 55′ East; Bar. 29.60 at 3 A. M. and 29.70 at Noon.

Ship John Macvicar, *Capt.* N. MacLeod, *from Calcutta bound to Liverpool.*

I have not obtained this vessel's entire log, but an extract of it for 12 hours with a description of the hurricane appeared in a Liverpool paper and was copied into those of Calcutta. Omitting the letter to the Editor, &c. which accompanies it, the following is the log as given, with such additional information as can be gleaned from the description. This log is evidently kept in Civil Time.

* A good instance of incurving.

Ship JOHN MACVICAR, *26th April*, 1850.

H.	K.	F.	Course,	Wind,
1	8		S. S. W.	N. E.
2	9			
3	9			
4	9	4		N. N. E.
5	8	4		
6	8	4		
7	8	4		
8	8	4		
9	8			North.
10	8			
11	8			N. W.
12	8			

Estimated, noon.

Lat.	17.21' N.
Long.	87.46' E.
Bar.	29. 0'
Simp.	28.90'
Ther.	80. 0'

"At 2 A. M. commenced with fresh gale, dark cloudy weather and drizzling rain. At 4, increasing to a gale, with hard squalls and heavy rain, furled the mainsail, and double reefed the topsails. The Barometer falling very much, and the gale increased to a storm, with severe squalls and heavy rain, and the sea getting up mountains high. Furled the mizen topsail. Sounding the well constantly, but no apparent increase of water in it. At 10, a terrific sea struck the starboard quarter, and carried away the quarter-boat. At 11, increasing to a hurricane with an overwhelming sea breaking over fore and aft. Bar. and Simp. falling and now down to 29.10. Scudding in the hope of running out of it,* at great risk of being pooped which finally occurred and was a second time repeated. At "the climax of the hurricane" (at 11 A. M. as marked in the log) a sudden shift of wind from North to N. W. broached her to and blew all the sails from the yards. Laid too on the starboard tack and at 4.40 P. M. the Bar. and Simp. began to rise and the hurricane to abate but the sea was still as high as before. Just as the Barometer began to rise we had terrific loud thunder and vivid forked lightning. The mizen mast was struck but not much injured.

Abridged Log of the Ship DUKE OF WELLINGTON, CAPTAIN DUNCAN; *from Calcutta to London. Reduced to Civil Time.*

From the 17th April, 1850, when the Pilot left us until noon of the 21st, we stood to the S. S. E. and S. E. with light S. Westerly winds. Lat. at noon of that day 16° 50' North; Long. 89° 55' East; Bar. 30° 00'; Simp. 29° 80'; Ther. 84°.

On the 22nd April, we had light airs and hot sultry weather, wind veering from W. S. W. and N. W. to N. E. and East. Lat. Obs. 16° 15'; Long. 89° 42'; Bar. 30.20; Simp. 29.77; Ther. 86°. P. M. light airs and fine clear weather, towards sunset the sky to the Westward was covered with streaks of light hazy clouds of a deep red colour while the intervening sky was of a light green;† darkening in shade towards the horizon.

* They were scudding to *cross in front* of it, *and doing so too closely*, as will be shewn in the summary.

† The green sky noted here was probably only what is called in optics the sub-

Tuesday, 23rd April.—A. M. light breeze and hazy weather, to Noon moderate breeze at E. N. E. and hazy weather. Lat. Obs. 15° 18′; Long. 89° 26′; Bar. 30.00′; Simp. 29.75′; Ther. 86°. P. M. light breezes and cloudy weather, wind E. N. E. to N. E. sky at sunset similar to the previous evening.

24th April.—A. M. fresh breezes and squally at times, wind N. E. Noon strong breezes and continued rain; double reefed the topsails; breeze increasing fast. Lat. by Acct. 13° 8′; Long. 88° 49′; Bar. 29.90; Simp. 29.60; Ther. 83°, wind N. N. E. At 1 P. M. gale increasing fast with a close threatening sky and continued rain. Bar. 29.85; Simp. 29.56; Ther. 83°. Securing for bad weather, *I judged now that we were in the left hand semicircle of a Cyclone coming from the S. Eastward, the centre bearing from us E. by S. to E. S. E. and that a S. W. by S. course was the best to be adopted*, determined to carry all possible sail so as to run across the track of the storm before the centre could overtake us. At 4 P. M. the gale increasing, close reefed the fore and main topsails and furled the mizen topsail. Bar. 29.80; Simp. 29.50; Ther. 83°; heavy squalls at times with incessant rain with a heavy sea from E. S. Eastward, wind at North. 6 P. M. wind inclining to Westward of North. Bar. 29.76; Simp. 29.46; Ther. 84°. At 8 P. M. gale still increasing; Bar. 29.80; Simp. 29.50; Ther. 84°. At 10 P. M. strong gale with hard squalls, assuming a very threatening appearance, heavy Northerly sea with a deep cross sea from E. S. Eastward. Bar. 29.79; Simp. 29.47; Ther. 84°. Midnight wind from N. W. to N. W. by N. blowing a heavy gale and the squalls still harder with continued rain (had several flashes of lightning from 10 P. M. to Midnight, to E. S. Eastward) Bar. 29.78; Simp. 29.43; Ther. 84°.

25th April.—At 1 A. M. squalls very severe with a tremendous sea; took in the fore and main topsails and scudded under the foresail and fore topmast staysail, wind being now at N. W. At 2 A. M. it cleared up a little and became more moderate. Bar. 29.72; Simp. 29.40; Ther. 84°; the ship now scudding nicely under foresail, wind being at N. W. by W. At 6 A. M. the weather moderating and the sky looking much more settled, set the fore and main topsails. Bar. 29.78; Ther. 84°, wind W. by N. At 8 A. M. the weather continuing moderate made sail. Bar. 29.90; Simp. 29.60; Ther. 84°; the wind at West ½ North. At Noon moderate breezes, the wind at West. Bar. 29.90; Simp. 29.60; Ther. 84°; Lat. by Obs. 10° 47′ N.; Long. by Chr. 86° 51′ E. which gives 75 miles current setting to N. W. by W. on the two last days' work, as calculated by dead reckoning. A heavy sea following us from N. by W. At 5 P. M. passed

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jective colour from the effects of the red clouds; but these accurate observations are of high value as shewing the care of the observers.

the ship "*Cowasjee Family*," standing to the N. Westward, he communicated to us by signals that he had experienced much bad weather.

26th April.—A. M. moderate breezes at S. W. by W. and cloudy weather, at Noon, ditto winds and clear weather the ship tumbling about with a heavy sea from the Northward. Lat. Obs. 8° 56′; Long. by Chr. 87° 34′; Bar. 29.97; Simp. 29.70; Ther. 85°. From hence we stood to the S. Eastward with light breezes from S. Westward.

Our position at Noon of the 24th was, by Acct. from the day previous, Lat. 13° 8′ N.; Long. 88° 49′ E. But as we found we had been set to the Westward 60 miles at least, during the 24th and 25th (by the Noon Obs. of the latter day), I allow 20 miles set to the West during the 24th, as during the greater part of this day the weather was fine. Our position therefore on the 24th at noon would be Lat. 13° 8′ N.; Long. 88° 29′ E.; with the wind N. N. E. and close continued rain—this would give the centre of the storm E. S. E. distant say 150 miles: viz. the centre of its position would be Lat. 12° 14′ N.; Long. 90° 52′ E. From Noon until 8 P. M. we ran S. W. by S. 60 miles, and from 8 P. M. to Midnight 35 miles, with a strong set to N. W. by W. I allow the course made good to be S. W. ½ S. 95 miles, from Noon until Midnight; the wind was then N. W. making the centre to bear from us N. E. and somewhat nearer than at Noon, as the wind had considerably increased and the squalls had become much more severe; say distant from us 120 to 130 miles. The centre of the storm would now be in Lat. 13° 27′; Long. 89° 3′ (only 37 miles to the North East of the ship's position at Noon)—and it would have travelled N. 54° W. at the rate of 11 miles per hour; coming from the North end of the Little Andaman in a direct line to Vizagapatam.

At 1 A. M. the centre of the storm would be in its nearest approach to us as the bearing of the centre from the ship's position then, formed a right angle with the track on which the storm was travelling, in confirmation of which the glasses were then at their lowest point and the squalls so severe, that I took the topsails in, fearing the yards might give way. And I felt satisfied that the storm was travelling to the North-westward, and was then at its nearest approach to us, and that every mile it travelled and every mile we sailed was increasing the distance between us, which proved to be correct; for by 2 A. M. the weather cleared considerably and was more moderate. I had not left the deck from Noon until this time, except when going down to note the glasses. I put a sheet of paper and pencil in a convenient place at Noon, when I judged we had got into a Cyclone, so that what I have stated was noted by myself and when observed; the appearance of the sky I could not make much note of as we had almost continued rain until towards midnight when it would clear a little. Between the squalls the sky at that time assumed a very threatening appearance;

P27951 ~~14139~~.

the clouds were Nimbi and rising in dense volumes one above the other and of a light blue (or rather grey) leaden colour, we had some lightning from 10 o'clock until midnight of the 25th, but no thunder. I may have misjudged my distance from the centre but what I have stated otherwise was carefully observed, and with the course and distance run I was most particular.

North Eastern Coast of the Bay.

The H. C. Steamer *Enterprize* was at Akyab on the 26th April, her log states she had variable winds from N. W. to North round to East S. E. and S. S. E. with threatening appearances and drizzling rain.

On the 27th April, leaving Akyab for Calcutta, had a heavy sea from E. S. E. being at Noon in 20° 9½′ N.; Long. 92° 12′ East; Bar. 29.90; Aneroid 30.02; Simp. 30.00; Ther. 82°. Moderate and steady breezes from E. S. E. to S. S. East.

28*th April.*—Carried fine weather with a heavy chopping sea, now from S. W. Noon Lat. 21° 1′; Long. 89° 16′ East. Weather moderate and fine. Wind S. S. W. and fresh breeze.

The Post Master at Akyab says, in a report to the Principal Ass^{t}. Commissioner.

On the morning of the 26th, the weather was cloudy with Northerly and N. W. winds, accompanied with rain at intervals. The Barometer standing at 29.87. At Noon, the wind veered round to the Southward and Westward and blew fresh, with heavy rain. The Barometer on board was falling, being about 29.80. At 3 P. M. the wind shifted to the South Eastward from which quarter it blew a very fresh breeze until 8 P. M. when it gradually decreased.

27*th.*—Daylight, the weather was fine but cloudy at intervals with moderate S. E. and E. S. E. winds. Bar. 29.90. I do not think in my opinion there was any gale at this place on the days mentioned in your letter, but from the very heavy sea on the Bar. I should imagine there must have been a gale to the Westward some days previous. Noon of the 27th, the weather was fine with moderate Southerly and S. West winds and has continued so since.

Extract from a Weather Diary for April last, at Bulloah, forwarded by* G. LATOUR, *Esq. Deputy Collector.*

23*rd April.*—Wind N. W.

24*th.*—Wind N. W. to N.

25*th.*—Ditto N. E. and cloudy weather.

26*th.*—Ditto E. N. E. ditto and wind rising.

* Near the mouth of the Ganges and Burrampooter. Lat. 22° 53′ N. Long. 90° 59′ E.; called also Noacally.

27*th*.—Ditto E. S. E. to S. E. and S. W. and back to E. S. E. blowing hard during the night.

28*th*.—Blowing a hard gale with heavy showers, wind veering to S. W. hard squalls. Gale breaks at noon from S. W.

Total rain, ... 1 inch.
Elevation of Pluviometer..... 4 ft.

Abridged Log of the H. C. Surveying Brig Krishna, *Lt.* Fell, *I. N. Commander; from the Island of Preparis bound to Calcutta. Civil Time.*

On the 24th of April, the *Krishna* was at anchor off the Preparis, leaving it at 8 A. M. and at Noon it bore S. 30 East, 10 miles. The weather was gloomy with light and variable winds from N. E. to S. E. and South. Bar. at Noon 29.94. P. M. dark and squally to the S. W. squall rising with a remarkable double arch,* and the rim well defined. Midnight fresh breeze E. N. E. and gloomy with a swell from the South and lightning to the Eastward. Bar. 29.90; Ther. 83°.

25*th April*.—A. M. to Noon moderate breeze E. N. E. to East, with passing squalls and clouds passing from East to West with a long swell from S. S. E. Lat. 16° 53½′ N.; Long. 92° 14½′ E.; Bar. 29.86; Ther. 83½°. P. M. increasing breeze East, but clearing a little to the South East; a long increasing swell from the S. S. E.; at 8, dark threatening appearance to the S. Westward; Midnight, wind East, strong breeze with rain thunder and lightning. Bar. at 5 P. M. 29.74; midnight 29.79; Ther. 84°. Making preparations for bad weather.

26*th April*.—To Noon strong breeze East to E. S. E. to 10 A. M. when S. East, and at Noon S. E. b. E. dark, gloomy looking appearance to the Southward and S. S. W., with a heavy Southerly swell. Lat. Acct. 19° 19′; Long. by Chr. 90° 15′; Bar. 29.80; Ther. 85°. P. M. strong breezes S. E. at 7 P. M.; and South, and at 5 P. M. E. S. E. moderate, at 9 hard squalls heavy rain, thunder and lightning, wind S. E. during the squalls; Clouds flying very wild, the lower clouds moving East to West, upper ones South to North. Midnight fresh gale E. S. E. and high sea. Bar. 29.78; Ther. 84°.

27*th April*.—A. M. fresh increasing gale E. S. E. with a high sea, rain, lightning and distant thunder. Wind hauling to S. E., S. S. E. and S. b. W. at Noon; vessel having laid to at 3 A. M.; at Noon no observation. Bar. 29.69; Ther. 84°. 3 P. M. saw the Station Pilot vessel, after which a few heavy squalls till evening when the weather moderated.

* These double arched squalls are often noticed in the Logs of ships on the approach of Cyclones.

Abridged Log of the Ship ARDASEER, *Capt.* LOVETT, *from Bombay to Calcutta. Civil Time.*

The *Ardaseer* was at Noon 25th April, in Lat. 15° 07′ N.; Long. 82° 54′ East with light Northerly breezes and fine weather. Bar. at 29.70.

26th April.—Lat. 16° 2′ N.: Long. 83° 53′ East; Bar. 29.58; fresh 7 knot breeze at N. W. b. W. with a tremendous sea; course N. E. b. N. P. M. breeze decreasing with a dark gloomy appearance and a heavy swell from the Eastward; at 4 P. M. light airs. Bar. 29.50, to 29.37 at 8 P. M. when dark and gloomy to S. East with a terrific swell, the ship pitching violently. Midnight Bar. 29.47.

27th April.—Breeze from S. S. E. and fine. Lat. 17° 05′ N.; Long. 86° 00′ East. Bar. 29.70; Ther. 87°.

Abridged Note from the Log of the Ship BELLE ALLIANCE, *Capt.* STEPHENS.

This vessel on the 25th April, in Lat. 16° 30′ N.; Long. 83° 5′ East; had her Bar. 29.73 (from 29.85 on the 24th); Simp. 29.45 (from 29.45 on the 24th); Ther. 85°; very cloudy with an appearance of bad weather. Fresh wind at North with a very heavy sea from the N. East making the ship plunge very heavily. On the 27th, Southerly winds and fine weather.

Extract from the Log of the Dutch Ship NEERLANDSCH INDIE, *Capt.* L. DELCLISUR, *from Calcutta to Amsterdam. Civil Time.*

The *Neerlandsch Indie* left the Pilot at midnight 24th, 25th,—April, 1850; and from that time stood to the S. S. W. with winds from N. N. E. and cloudy weather with rain.

Noon 25th April by D. R. in Lat. 20° 8′ N.; Long. 87° 53′ East. Bar. 29.93; Ther. 86°. Light winds from N. E. cloudy weather with rain; at 10 P. M. increasing wind with a rising sea: made all preparations for bad weather, and reduced ship to bare poles.

26th April.—At 3 A. M. the sea still increasing causing the ship to labour much, and to take in water over all. Shortly after, the sky from being slightly cloudy, became thick and dark and rising ahead, the Barometer still falling. In the morning at 4 o'clock it stood at 29.72; Thermometer 86, all of which taken together made us surmise that we were in the neighbourhood of a hurricane. Decided in consequence on laying to under close reefed main topsail with the starboard tack on board, her head laying S. E. Southerly. The storm increased speedily in power, so that at noon the sea was terrific. The seas were

coming on board from all quarters which caused the ship to labour most dreadfully, both ship and rigging suffering much. At Noon in Lat. 18° 4′ N.; and Long. 87° 22′ East; Bar. 29.2; Ther. 86°. Wind E. N. E. At 2 P. M. wind East, blowing heavily; at 3 P. M. the wind decreased suddenly to light airs first S. E. and from East and West alternately. Bar. 28.75; Ther. 86°; which made us fear that we were in the centre of a hurricane; at 5 P. M. it again began to blow from W. S. W. with heavy rain, thunder and lightning, laying to the S. S. E. with the larboard tack on board under the same sail to steady the ship. At 7 P. M. the wind suddenly became so violent that the ship went over on her beam ends on the larboard side. Immediately on the bursting of the hurricane the storm fore staysail and close-reefed main topsail were blown away and the ship rose a little. The hurricane increased so much in intensity that all the topmasts and jibboom were carried away and fell overboard, remaining hanging by the rigging alongside the ship. The fore topsail yard had previously been broken in the middle. The violence of the wind was so great that nothing could be done, any verbal communication being rendered impossible.

At 9, the wind began somewhat to slacken although the sea still continued steadily to rise, several successive seas broke on board carrying away part of the bulwarks, ship in great distress and making much water, sky overcast with dark clouds, every thing together contributed to make this night one of the most dreadful to describe. As soon as the wind slackened, got a studding sail in the starboard mizen rigging under which we remained lying to. At 10 P. M. the Bar. had risen to 29.5; the Ther. remaining the same.

27th April.—At daylight wind decreasing but the sea high yet, began immediately to clear the wreck. At noon in 18.2 N.; Long. by Chr. 87° 59′; Bar. 29.8; Ther. 86°.

Sunday 28th.—Clear weather light top gallant breeze from S. and S. W. fine weather.

Abridged Log of the French Ship La Meuse, *Captain* Hauvet, *from Havre bound to Calcutta, reduced to Civil Time.*

25th April.—A. M. a fresh 7 knot breeze from the N. E. (to which it had gradually freshened since noon of the 24th), with threatening appearance; making all preparations. Noon increasing and sea getting up. Wind about N. E. to N. N. E. Lat. 17° 1′ N.; Long. 84° 40′ East of Paris; 87° 00′ East of Greenwich. P. M. wind variable from N. E. and unequal in strength. Sea increasing. At 4 P. M. hove to. Wind N. East.

26th April.—A. M. heavy squalls and sea from N. East with dismal appear-

ances to Noon* when Lat. 18° 24′; Long. 83° 55′ Paris; 86° 15′ Greenwich. P. M. Wind North but variable; at 9 P. M. N. N. W. Midnight lying to under close-reefed main topsail, blowing a hurricane. At ½ past 7 P. M. a terrific squall with violent thunder and lightning in which it was impossible to be heard.

27th April.—A. M. wind about W. b. N. and at 5 A. M. west, decreasing rapidly to noon when in Lat. 18° 05′ North; Long. 85° 12′ Paris; 87° 32′ Greenwich. P. M. wind is marked at S. West.

Abridged Log of the Schooner Joseph Manook, *Capt.* H. Hicks, *from Akyab to Calcutta, reduced to Civil Time.*

25th April, 1850.—At Noon Lat. 19° 53′ N.; Long. 89° 30′ East. P. M. wind N. E. b. N. course, N. W. b. N. moderate and fine, a 3 knot breeze decreasing at sunset with threatening appearances. At 7.30 P. M. a heavy squall from the Northward, increasing to a gale at Midnight from N. E. with every sign of bad weather, though the Bar. is at 29.80.

26th April.—At 10 A. M. wind marked N. E. b. E. 7.30 A. M. wore ship to S. Eastward. Noon weather as before. Lat. Acct. 20° 30′; Long. 89° 10′ E.; Bar. 29.90. 5 P. M. wind marked E. N. E. 8 P. M. hove to, wind N. E.; at 10 P. M. East, gale and sea increasing.

27th April.—1 A. M. wind S. East; 2, S. S. E. and 3, South; Noon S. S. W. vessel lying to with heavy gale and sea, lost our boat. Bar. at noon 29.40.; P. M. Bar. 29.36; at 8 P. M. moderating. A brig in company since sunset of 26th; proves to be the Tavoy, Pilot Vessel.

28th April.—Weather gradually becoming fine.

Abridged Log of the Ship Rob Roy, *Capt.* J. Francis, *from Singapore towards Calcutta, reduced to Civil Time.*

25th April, 1850.—Wind N. Easterly and N. E. b. N.; at 4 A. M. steady breeze and cloudy weather freshening to Noon, when Lat. 19° 2′ N.; Long. 86° 24′ East. P. M. strong breezes and heavy sea with sharp squalls. Wind from E. N. E. to Easterly, and again E. N. E. at Midnight, when Bar 29.15.†

26th April.—Increasing breeze to strong gales with high sea; at noon wind from N. E. b. E. to N. N. E. Bar. 4 A. M. 30.10; at 10 A. M. 29.71; noon 29.70. Position not given, but the land had been seen; at 9.30 P. M. on the 25th distance about 6 miles. P. M. very strong gales N. N. E., heavy rain and

* Mauvaise apparence tout a fait. Ciel allumé—(literally altogether bad appearances and "sky lighted up") is entered here at 8 A. M. I suppose this alludes to the red sky, but I had not an opportunity of enquiring.

† 30.15 is probably meant since it must have fallen afterwards to 29.70 before Noon.

high sea, Bar. 29.67 to 29.00 at Midnight. At 7 P. M. wind North. At 11, blowing terrifically. Shifted cargo and ballast, lost boats and other damage.

27th April.—A. M. wind hauling to the Westward; 2 A. M. abating; at 4 A. M. wind W. S. W. Sea going down and gale fast abating. Noon fine weather. Lat. 19° 29′ North; Long. 87° 06′ East; Bar. 29.79.

On the Coromandel Coast.

The following is the Register of the Barometer and Thermometer at the Madras Observatory from the 23rd to the 27th of April.

Date.		Barometer.			Thermometer.		
		8 A. M.	4 P. M.	10 P. M.	8 A. M.	4 P. M.	10 P. M.
April	23rd.—	30.014	29.934	30.012	85.2	91.9	83.3
1850.	24th.—	—.030	—.886	29.935	82.6	92.1	83.7
	25th.—	29.925	—.830	—.906	85.4	95.2	84.9
	26th.—	—.930	—.830	—.936	87.3	98.0	85.5
	27th.—	—.962	—.884	—.976	87.5	94.2	85.0

Abridged Copy of the Note Book of Capt. Shire, *Ship* Iskander Shaw, *from Cochin to Calcutta. The Log Book being lost in the severe gale, this begins from the 26th April,* 1850.

At Noon Lat. 18° 30′ N.; Long. 85° 15′ East; P. M. the weather seeming threatening (although the Bar. showed no indication of it being still at 29.70, the same as it had been during the past ten days), shortened sail, in reefs and down royal yards; tacked ship and stood to the Northward, but towards sunset finding that the angry appearance of the weather still increased, and our distance from land being very little, tacked again, and stood to the S. Eastward to gain an offing and guard against any set of current on shore in case a gale should come on, the wind being then at E. N. Eastward.

27th April.—At 2 A. M. the wind coming in strong gusts reduced ship to storm sail; the Bar. had now fallen to 29.60, and during the night we stood about S. E. at the rate of three knots, under the foresail and double-reefed main topsail lowered on the cap intending at daylight to send down the top gallant yards and masts. During the night the Bar. did not fall any more, but strange to say at 4 A. M. it again rose to 29.70; although at daylight still more gloomy and threatening; hauled up the foresail and laid her to, under close-reefed main topsail. Almost instantaneously the wind blew with an inconceivable fury and the sea rose in the like manner and with both came on torrents of rain; after several vain attempts to furl the foresail called the people down until the fury of the

storm was over, intending to send them up again when it had passed; they had scarcely got on deck when we lost the Jibboom; cut away the wreck and soon got clear of it, and we had no sooner done so then with a terrible lurch to leeward accompanied by a dreadful squall of wind and rain that actually screeched through the rigging as it passed, away went the whole three topmasts just above the caps with all their top hamper; in their fall they carried away the fore and crossjack yard arms, and we had thus only the main yard left; in the space of one hour from daylight from being all in trim and fair sailing condition we were reduced to a perfect wreck. The ship being now deprived of any sail to steady her rolled at times most terribly, all our efforts to secure the lower yards by guys, &c. &c., proved quite ineffectual. On again looking at our treacherous Barometer we found that now when the mischief was done it had fallen to 29.45; and we now to our sorrow found out also by the shifting of the wind to the N. N. Eastward that we had become involved in a circular tempest, and not as we first thought an ordinary gale, such as is usual about the full and change; from the circumstance of the Barometer giving no warning, and also because we experienced no swell setting on shore which is always regarded as a sure precursor of such tempests. It was too late now to attempt to run out of it, as it would have been too hazardous to scud or do any thing else (excepting to lay to) at the height to which the storm had risen. Up to noon the same tempestuous weather continued; carried away the starboard cutter. Lat. by Acct. 18° 00′ N.; Long. by Acct. 86° 10′ E. From the noon of this day until midnight the gale or hurricane if possible more dreadful than at first; indeed any measured description of it that we could give would fall far short of the reality experienced by us, and as the night closed in, there was no prospect that the vessel would live through the dreadful sea until daylight. She laboured and strained at such a rate that any vessel less strong must have perished in what she encountered, but happily at Midnight it began to break and had fallen to little wind.

28th April.—At daylight the prospect that presented herself was frightful. During the whole of this day the people employed, when the terrible violence of the storm abated at intervals, in cutting and clearing away the wreck.*

Abridged Log of the Ship ATALANTA, *Capt.* FARLEY, *from Chooramun (Balasore) to Madras, reduced to Civil Time.*

At Noon, 25th April, 1850, in Lat. 19° 33′ N.; Long. 87° 38′ East; light breeze from East, and cloudy with small rain. P. M. wind E. N. E. (course S. S. W. 8′ per hour) gradually veering to N. N. W. by 8 P. M. At 10, threatening weather.

* Capt. Shire states that no lightning was experienced till at the close of the Cyclone, and then to the Southward.

26th April.—Daylight, increasing gale with confused sea. 11 A. M. wind suddenly shifted to the Westward with tremendous fury, carrying away the three topmasts and mainmast head, ship on her beam ends. Noon the same weather. Lat. 16° 10′ N.; Long. 85° 47′ East; Bar. 29.40. P. M. hove to with a sail in the mizen rigging. At 3 P. M. Bar. 29.50. Lower deck cargo shifted, and ship almost swamped. Wind not marked from Noon this day.

27th April.—A. M. moderate and fine, bore up for Calcutta. Noon in Lat. 17° 11′ N.; Long. 86° 47′ East.

False Point Palmiras.

The following report is from Mr. Barckley, Superintendent False Point Light House.

26th April.—False Point was visited with a severe Cyclone. At noon it commenced to blow from the Eastward in heavy squalls, with heavy rain at times, and at 5 P. M. the wind veered to the S. E. and at 7 P. M. to the Southward, and at 9 P. M. to the S. W. and then the weather moderated; and fell almost a calm—

27th April.—To 2.30 A. M. with a very clear sky overhead and a very thick mist surrouuding the horizon; at 3 A. M. it commenced to blow from the N. W. a complete hurricane until 5 A. M.

At about 2 A. M. the greater part of both Dodwell's and Plowden's Islands were inundated, and I should say that the water rose about 5 feet more than the usual rise; and it did not subside for about 9 hours after the Cyclone had blown over; and the wind steady at S. S. E.

I have been some twenty miles round to the different villages, there are no lives lost, but there is not a house left with a roof on, and a great many blown down altogether. These villages lie all to the N. W. of the Light House.

Five of the Company's Salt works are completely destroyed.

We have received a great deal of damage at the Light House. The Portico, bathing-room, and most of the men's houses blown down, and the garden laid a complete wreck, not a tree left standing.

In reply to my farther queries, Mr. Barckley adds the following notes and tables of the Barometer and winds at different hours.

"In answer to your note dated the 3rd instant, I beg to state that on the evening of the 25th there was a very thick haze all round the horizon, with a red appearance, and a cross scud overhead, from the N. W. and S. W. with the wind from the S. E. with a clear sky. On the 26th it was cloudy, and thick all over throughout the day; between 12 and 3 o'clock on the night of the 26th, there was heavy forked lightning from the N. W., and a clear sky overhead with a bright moon, and stars thining."

State of Barometer and Thermometer at False Point on the 26th and 27th April, 1850.

APRIL 26TH.

Hours.	Barometer.	Thermometer.	Winds.
8 A. M.	29.80	80° 0	East.
10 A. M.	29.80	81° 0	East.
Noon,	29.78	82° 0	East.
2 P. M.	29.78	82°30	East.
5 P. M.	29.78	81° 0	S. E.
7 P. M.	29.70	81° 0	South.
8 P. M.	29.70	81° 0	S. W.
Midnight,	29.60	80° 0	S. W.

27TH.

Hours.	Barometer.	Thermometer.	Winds.
2.30 A. M.	29.60	80° 0	N. W.
8 A. M.	29.60	79°30	S. S. E.
10 A. M.	29.68	79° 0	S. S. E.
Noon,	29.73	80°30	South.
2 P. M.	29.75	81°30	S. by W.
5 P. M.	29.76	82° 0	S. by W.
8 P. M.	29.80	81° 0	S. by W.
Midnight,	29.80	80° 0	S. by W.

BALASORE.

Statement of the Gale of the 27th April, 1850, *with notes of Barometer and Thermometer from the 24th instant, by* A. BOND, *Esq. Master Attendant, Balasore.*

26th April, 1850.—Cloudy and threatening with light breeze from N. E. with slight rain at times, Barometer falling; 29.70 at 2 P. M.; at 5 P. M. 29.60, and every appearance of an approaching gale; ordered the Orissa's anchors out* with a long range of chain, head and stern; at 9 P. M. breeze freshening with

* A Government schooner stationed at Balasore.

puffs and more rain from North and N. E.; at 10, Bar. falling to 29.50; Ther. 86°; puffy throughout the night, with lulls at times and Barometer falling till 5 A. M.; the 27th, when the breeze increased on the flood to a smart gale, Bar. 28.90; at 6 A. M. wind N. b. W. blowing hard with heavy rain and flying clouds with sheets of rain in the heavy gusts; at 7 A. M. Bar. 28.80. Gale increasing and veering gradually Westerly to N. W.; at 8 A. M. Bar. 28.75; blowing harder, in puffs like the sound of thunder, heavy sheets of rain and passing heavy clouds with squalls from the W. N. W. Bar. at 8 ½ A. M. 28.69; where it remained till 9 A. M. with the wind at West sweeping away the largest trees and the thatches of all the houses in the very heavy gusts; the wind roaring; at ½ past 9, the Bar. began to rise being 28.73; the wind W. S. W. (though puffy and heavy at times) and decreasing, and the clouds began to separate, indicating a breaking up of the storm, Bar. rising till 10 A. M. when the Bar. rose to 29.1 and continued to rise till 11 A. M. when it stood at 29.60; and the wind entirely lulled at that hour.

The ship *Atalanta*, Captain Farley left our port, Chooramun, April the 25th, bound to Madras two days before the gale with a cargo of rice having a light Northerly breeze.

This gale was the heaviest experienced since 1832 at Balasore, but not so severe as in 1832. Two vessels at Chooramun laden with paddy are ashore, and in this gale the Bulramgurry Flag staff was blown down.

State of Bar. with winds and weather up to the 27th April, 1850.

	Bar.		*Bar.*	*Ther.*	
24*th April*, A. M.	29.80	P. M.	29.70	85°	Wind N. W. to N. E. cloudy with a few drops of rain.
25*th* „ „	29.76	„	29.70	85°	N. W. to N. E. fine breeze and cloudy, with thunder and lightning.
26*th* „ „	29.75	„	29.60	82°	N. W. to N. E. cloudy and muggy with a few drops of rain and flashes of lightning.
27*th* „ „	28.69	„	29.65	78°	Squalls à N. E. from 3 P. M. yesterday, a strong heavy gale from N. E. to W. b. S.

with heavy rain from 5 A. M. to 10 A. M. in squalls; complete sheets of rain and very heavy gusts; towards high water wind veering gradually to the Westward. High water at Bulramgurry (Seaward) ¼ to 10 A. M.

Force and direction of Gale.

N. E. to E. N. E. heavy gale.
- 40 miles N. b. E. of Balasore, gale heavy.
- 50 miles N. E. of Balasore, gale very heavy.
- 35 miles E. N. E. of ditto ditto.

S. S. W. to W. S. W. moderate.
- 20 miles W. S. W. of ditto, gale more moderate.
- 40 miles W. S. W. of ditto, very moderate.
- 26 miles S. b. W. of ditto, (Chooramun) moderate but stronger than to the S. W.
- 50 miles S. W. of ditto (near Pt. Palmyras) heavy gale similar to Balasore N. to West.

Gale taking the range of the hills on their Northerly and Easterly side to Point Palmyras. Balasore being near to the Westerly edge of the Cyclone.

Gale ceased to the S. b. W. at 9 A. M.

N. B.—No gale close in to the hills, taking the direction of them, but 8 miles distant from them, from N. E. to S. b. W.

We had no lull at Balasore for more than five minutes, when the wind shifted westward with very heavy puffs.

Rough notes of the direction of the wind during the Cyclone of 27th April, 1850, *taken at the Dantoon Staging Bungalow,* 10 *miles North of Jellasore, Lat.* 22° 02′ N. *Long.* 87° 25′ E. *by Mr.* THOS. CAMPBELL, *forwarded by Mr.* BOND.

25th April, 1850.—2 P. M. fresh Easterly gales and rain continuing during the night.

At daylight 27th April, heavy gale from North East to East with much rain. At 10 A. M. as usual in these storms, there was a lull for about half an hour during which the wind shifted and the hurricane returned with terrific violence from S. S. West, accompanied by a deluge of rain gradually veering round to the Westward and breaking up about W. N. W. at 3 P. M. Height of gale between 11 and 12 A. M. of the 27th. Occasional thunder and lightning during the storm, but not severe.

No Barometer or Thermometer at hand.

Abridged Letter from Capt. SPENS, B. E. *Surveying Embankments at Hidgellee.*

DEAR SIR,—I was during the Cyclone at a Bungalow on the sea coast at a place called Diggea in Purgunnah Beercool. There are two bungalows here now and from time to time there have been others which have been destroyed by encroachments of the sea. Warren Hastings had a bungalow here. The climate is very fine during March, April, May, and until the rains begin in June. When rain falls to any amount it becomes subject to fevers. The Thermometer during the latter part of April last in a house without glass windows and quite open to the S. W. Monsoon, averaged 85° during the day and 78° or 80° during the night. The bungalows are generally called the Beercool bungalows and are about two miles S. W. of the Diggea Mohun.

There had been much rain on the morning and evening of the 26th April, and towards night it was accompanied by strong wind from the North East. This wind kept increasing until 3 A. M. of the 27th, when it became a hurricane, which continued blowing from the same direction for some time, viz. from the North East. Furious as it was at 3 A. M. it kept increasing in violence until between 8 and 10 A. M. when it had veered gradually round to the East, and a very few points to the South of East, and attained its height of violence. After which (although blowing very violently until 2 P. M.) it gradually diminished in force and veered round by the South to the South West, and became the usual South West Monsoon. It was fortunate that it began from the North East, as that kept the sea off the Coast of Hidgellee at first, and afterwards when the hurricane had attained its height or rather before the tide began to ebb, otherwise much more damage would have ensued to the bunds, and to the country by inundation.

I am inclined to think that the gale blew more furiously at Beercool than elsewhere, it certainly did so in comparison with what occurred to the Northward, but I have not information to allow of my making a comparison with its effects to the South.

The bungalow in which I was residing was situated within 100 ft. of the edge of a range of sand hills which here line the Coast. That portion of the sand hills on which the bungalow stands is 13½ ft. above the high Spring tide mark, but on each side of it the hills diminish in height about 2 ft. During the storm the sand in front of the bungalow was cut away as far as the bungalow at the South East corner, from which two small rooms were undermined and fell into the sea, and within 25 ft. at the South West corner the sea rose to a height of 11 ft. high and passed over the sand hills right and left of the bungalow which were of this height, and the spray was dashed into the verandah and rooms of the bungalow. As I said before, the ebbing of the tide came at a most opportune time to prevent the sea from getting over the sand hills in larger quantities and for a longer time.

The roof was denuded of thatch in many places and the violent moving of the whole frame of the roof cracked the five verandah pillars and pulled a tie-beam out of the wall. Every room except the N. W. bathing room leaked, and a large quantity of salt water had been dashed into all but this room. I momentarily expected the frame work of the roof to give way and fall in, but luckily the rafters and frame kept their places.

Two Out houses were blown down; roof, walls and all. A third, was very much injured, but managed to remain standing, though in a tottering condition.

The Government embankments were overtopped and breached in all directions between the Diggea Mohun and the Peechurbunnee Khall, and the country

flooded. A reat number of cattle were drowned, but only a few people, at least I have only heard of 4 or 5.

To the Northward near the Russoolpore river in Purgunnah Magna Mootuk, the storm was by no means so severe, the sea did not rise more than 7½ ft. at most and only a small portion of land has been inundated in the neighbourhood of the Mozapore Khall where its embankments and those on the sea coast adjoining were not high enough.

Special Report from S. RANSOM, *Esq.* BRANCH PILOT, *Commanding H. C. P.* BRIG TAVOY.

I have incorporated the logs of the H. C. Pilot and Light vessels in the tabular statement as usual, but the following very graphic report from Mr. Branch Pilot S. Ransom will be found of great interest.

This gentleman was desirous of obtaining leave to make the experiment of starting from the Light vessel to cross in front of the Cyclone and run round it, as recommended in my Eighteenth Memoir (Journal Vol. XVIII. p. 912, *Practical Deductions*, &c.) but this permission could not be accorded to him, as it is indispensably necessary that the station and cruising vessels should keep as near their post as possible, and to the last hour, to assist or signalise to the inward bound traders should any approach the Sandheads at these dangerous times.

Letter from S. RANSOM, *Esq.* BRANCH PILOT, *Commanding H. C. P. V.* TAVOY.

On the evening of the 24th April, I had gone to sleep (on deck) with variable airs from West to North; at 1 A. M. of the 25th, I was awakened by what appeared to me a strong breeze, but on getting up to inspect it I found it not strong, but that it had a peculiar moaning sound, like wind through trees or old buildings, its direction about N. E. and the sky covered with a heavy leaden colored appearance, not an opening to be seen, occasionally a few drops of rain fell; of course I made up my mind to weigh and cruise, and not to anchor again until I saw the result of the weather. From daylight of the 25th to the evening, the wind continued coquetting from N. N. E. to East, with the same leaden appearance, I stood to the Eastward first and then P. M. to the Southward about 28 miles, as you will perceive by the log; but the glasses rising a little and the general appearances being better, induced me to retrace my steps, and at midnight I was laying to along side the Eastern Channel light vessel. 1 A. M. 26th, the weather became worse, by increasing gusts from the N. E. I now reduced canvas and determined to get an offing as fast as possible, as the weather could not be now mistaken, and the instruments were all gradually sinking. By daylight of 26th, it was blowing a gale from N. E.; I had now obtained a position

about 38 miles S. S. E. of the lower floating light, with a drift of 90 miles to the Westward, so laid to under a close-reefed topsail with my head to the S. E. fully expecting that if it was a Cyclone approaching that we should be completely in its track. Gladly would I have spanked away to the S. S. W. and endeavored "to cross its hawse" but I had no authority to go away so far from my station, and I felt moreover that with attention and sea room my light little Brig was equal to any weather. Our Barometers up to 8 A. M. of the 26th, showed no very great depression but continued to fall slowly, the weather gradually getting worse, and the sea rising fast in confused heaps, the squalls at times fearfully hard. Just at noon occurred one of the strangest spectacles I have ever witnessed since going to sea (upwards of 30 years) that is, from being in a gale of wind, and to all appearances increasing to a hurricane, we in an *instant* plunged into a space of beautiful weather. The sun shining, clear blue sky overhead, and not wind enough to keep the sails from flapping against the masts, this put me on my guard and I thought of your "treacherous calm or lull," it continued thus for about one and a half hour, the dark and dense masses which floated away to the N. W. and S. W. were frightful to look at, and put me in mind of a curtain being drawn up at a theatre, the glasses did not appear to be affected by this but continued to fall, as we drifted to the S. W. 2 P. M. sky overcast again and threatening appearances, more particularly from South to S. W. every now and then sharp flashes of lightning in that quarter, but no thunder. By midnight of the 26th, I consider the hurricane to have been fairly on ; Marine Bar. 29.57 ; Aneroid Bar. 29.65 ; Simp. 29.56 ; from this to 3.30 A. M. 27th, the instruments fell to 29.37. 29.51 and 29.44, the wind blowing as hard as there was any occasion for, commencing about this time to veer from N. E. to East ; at 4 A. M. it had gone round to S. S. E. the lightning and threatening appearances to the S. W. increasing ; up to 5 A. M. the gusts were terrific enough to tear the masts out of the fine little Brig, but she breasted it under a close-reefed main topsail like a sea gull without shipping a sea or making any water ; the glasses from 5 A. M. rose rapidly, and the wind going to the Westward of South decreasing in strength, I shaped my course for the "Pilot's Ridge" and struck soundings on it by 9 P. M. The Schooner *Joseph Manook* was in company with us during the worst part, and we could not but admire the ease with which she seemed to encounter it, under a close reefed spencer and a tarpaulin in main rigging as a balance. This Cyclone is earlier on the Sandheads than ever I recollect having them, and it was not attended by any "swell" though that which did get up with the breeze was enormous, but local, from the existing hurricane, and subsided with it, all the other signs were perfect and unmistakeable.

I add, to complete this valuable report, an extract from Mr. Ransom's Barometrical register.

Table of Barometrical, Aneroid, Simpiesometer and Thermometer observations on board the H. C. P. V. Tavoy, commanded by Mr. S. Ransom, B. P. 26th and 27th April, 1850.

Date.	Time.	Ther.	Mar. Bar.	Aneroid.	Simp.	Wind.	Weather.	Aspect.
Tuesday 26th April, 1850.	2 A. M.	82°	29.77	29.94	30.05	Strong N. E.	Squally.	Dense clouds.
	4	82	.70	.87	.05	..	Blowing and	Cloudy.
	8	84	.75	.89	29.94	..	rain.	..
	2 P. M.	82	.63	.78	.70	Calm.	..	Dense cloudy.
	4	82	.61	.76	.65	..	..	..
	6	82	.65	.78	.66	East Gale.	..	..
	8	82	.57	.65	.56	East.	Gale.	..
27th April.	1 A. M.	80	29.41	29.59	29.50	E. to S. E.	Squally.	Fierce indeed.
	2	80	.37	.53	.45	..	Hurricane.	..
	3.30	80	.37	.51	.44	..	..	..
	5	80	.40	.57	.50	..	..	..
	6.20	80	.50	.66	.60	..	..	..
	7	81	.54	.69	.64	..	..	..
	8	81	.59	.78	.75	S. S. E.	..	..
	10 A. M.	82	.68	.82	.79	South.	Hurricane.	..
	2 P. M.	82	.70	.85	.79	S.S. W.Sd.	Moderating.	..
	8	82	.80	.91	.83	S. S. W.	Good.	..

Observations.

It may be noted here that this is the first comparative registry we have on record of the three instruments in a Cyclone and that the results are as follow :—

Marine Barometer fell in 25½. hours, ... 00.40
Aneroid, ... 00.43
Simpiesometer,..... 00.61

And that though all were lowest at the centre of the Cyclone yet in the first 12 hours the fall was as follows :—

M. Barometer,..... 00.14
Aneroid, ... 00.16
Simpiesometer,..... 00.35

So that, as warning the Mariner of the approach of the Cyclone, the Simpiesometer appears to be, by far, the best guide. During the rise from 3½ P. M. to 8 P. M. the three instruments gradually approach each other, till at 8 P. M. there is only a difference of 00.01. between the amount of the rise, which may be due to errors of observation. I have treated at length of this comparative trial of the three instruments in a separate paper, and have there endeavoured to assign a cause for the difference. H. P.

N. B.—Since writing the foregoing I have seen Captain Biden's report on the gale which has occurred at Madras, one symptom of which reminds me of its being similar with us here—(i. e.) *no admonitory swell*, which induces me to think that both these gales have *settled down* suddenly upon us. I observed some days before the Cyclone of April last, that the upper strata of the clouds were sadly torn and distracted, whereas the lower ones were regular and going with the existing wind, the same appearances was presented at the Sandheads on the 23rd, 24th, and 25th May last. I merely mention this, as there is a curious coincidence in no swell having preceded either of the gales. S. R.

Extract from a letter from Mr. W. AINSLIE, *Officiating Collector of Balasore, to the Commissioner of Revenue for the Division of Cuttack, dated the 15th May,* 1850; *forwarded by* G. PLOWDEN, *Esq. Secy. Sudder Board Revenue, by order of the Board.**

From the evening of the 24th April, the weather had been very threatening, with strong but unsteady breezes varying in strength, from E. veering to N. W. with rain, thunder and lightning, until the afternoon of the 26th, when it had again shifted to N. E. From this time which I consider the commencement of the Cyclone, the wind increased in force, gradually shifting to N. W. from which point it continued to blow with great violence, accompanied by much rain till 8h. 30m. A. M. of the 27th, (the Barometer had, at this hour, fallen to 28.69.) It then veered to W. its violence still increasing. The gale was at its height at 9 A. M. and continued with unabated fury till 11 A. M. when it began to decline and shifting to S. W. finally broke up. This storm exceeded in violence the storm of October, 1848, but was of short duration, and fortunately in a less unfavorable direction. Excessively heavy rain accompanied the gale to its close. The quantity which fell during the storm was very great, but as the Pluviometer at the office was blown away and broken there was no means of ascertaning it exactly. Indeed had the instrument remained uninjured, it would not have shown a quantity approaching to the actual fall on account of the violence of the wind. All the low ground in and about the town was flooded to the depth of several feet, the water flowing over the roads to the depth of a foot or more, as the bridges were inadequate to carry it off.

From reports received from the interior, it appears that the force of the storm was felt principally on the Coast from Dhamrah to Dusmulling. At this point the Coast trends to the Eastward and the storm passed inland, its Western limit being about in a line from Balasore to Bustah, inland, and to the S. of Balasore it did not prevail in such force as to cause much damage.

* A few alterations have been made in this report, in accordance with an explanatory letter afterwards sent of which a copy was forwarded to me.

The reports from the Coast to the Southward describe the storm to have been similar in character and direction to what I have above described, while to the Northward, the gale appears to have veered from N. to E. and S. E. and finally broken up at S. Its general direction as indicated by the results was from S. to N. In consequence of this storm having occurred during the height of the spring tides, several parts of the Coast, especially near the mouths of rivers were inundated by the sea. Dhamrah, Bhograi and Kamardachour (at the mouth of the Soobunreka) suffered most in this respect. The reported loss of life is small, amounting to not more than eight or ten persons, and of these several were children crushed by the falling of walls. Three cases of death by drowning are included in these; the loss of cattle has been considerable, about 250 to 300 are said to have been drowned by the inundation, principally those in Dhamrah, besides these many are said to have been drowned by being driven by the West wind into the sea, the number of these is estimated at 400 to 500, but this is probably greatly exaggerated.

Extracts from a letter from H. BAILLIE, *Esq. M. D. Civil Surgeon and Salt Agent at Hidgellee, forwarded by* C. BEADON, *Esq. Secy. Board of Salt and Opium.*

The day previous to the storm of the 27th ult., the wind was light and Easterly, the afternoon of that day we had drizzling rain which increased towards night. About 5½ o'clock the morning of the gale it was raining, and the wind even then blowing with unusual force from the East, it gradually increased in violence till about 9 o'clock, when it raged a perfect hurricane. At intervals of a few minutes, a blast would pass, shaking the walls of the house I was in, this state of matters continued till past eleven when the wind shifted to the South, and later in the day to the South West, where it settled. So soon as the wind changed its course from the East, the decrease of its force was plainly perceptible; still, even when South Westerly, an occasional gust would occur.

From subsequent examination of places in this district which were subjected to the influence of the Cyclone, I assume that it was severest in Beercool Pergunnah, which lies to the South West of Contai, this opinion is strengthened by the following circumstance; that of the three ghauts* of this agency, the greatest amount of injury to buildings happened at Ramnuggur. The *golahs*† at all these depôts are constructed of similar materials, are of about the same size, and situated alike, having their ends North and South, and their flanks East and West, so that the extent of surface offered by them to the wind would be nearly equal in each instance.

At Russoolpore, 8 miles E. N. E. of Contai, no damage to the golahs was experienced.

* *Anglice*, places for embarkation. † *Golahs*, store-houses.

At Kissennuggur, 6 miles S. W. by S. of Contai, the thatch was in many places blown away, and a few bamboos broken.

At Ramnuggur, 16 miles S. W. by W. of Contai, five golahs (placed side by side) were more or less unroofed, the one to the East entirely uncovered, besides having many of its beams displaced, or blown down, the golah next to it less damaged and that nearest West, received the least injury.

As to the height of the wave or waves by which the country was inundated, I am unable to speak positively, but judging from the marks of the tide on the Megna a great sea bund, nearly opposite Contai, and portions of it which have been overtopped, I should imagine that a body of water of not less than six feet or more than eight feet in depth must have rolled over the salt lands outside the bunds, the tide was just about to turn when the wind shifted Southward, but for this providential circumstance the loss of life and property would have been infinitely greater. It is singular that to a similar shift of the wind does Mr. Barlow (in a letter to the Board) attribute the comparatively slight loss sustained by the gale of April, May, 1840, but on that occasion the flood was just setting in when the wind changed. I notice also from the same source, that the gale occurred (as in this year) during a spring tide. Capt. Spens, who is here on survey duty, was at Diggia in Beercool, occupying Mr. Dick's bungalow at the time of the gale, and from observations and measurement he considers that eleven feet was the height of the wave at that place, though the spray might have increased its apparent height by about two feet.

Barque Champion *at Saugor from* Mr. Master Pilot G. B. Smart.

Thursday, April 25th.—From Fultah to Kedgeree. First part, light Northerly wind, middle, light from East with a few heavy clouds to the N. N. E. latter part blowing a strong breeze from East, with a dirty slaty appearance to the N. N. E. and East like heavy rain; Barometer 29.80; when the sun set, the clouds to the Westward had a deep purple appearance, which led me to believe we were going to have a gale from that quarter: throughout extremely hot.

Friday, April 26th.—From Kedgeree to Saugor Flat Buoy. First part blowing hard from N. E. to East with the slaty appearaace all round, but much thicker to the Eastward, the clouds appeared to be stationary with peculiar gusts of wind; 8 A. M. Bar. 29.80; about the middle of the day at times almost calm; squalls commenced from N. E. with heavy rain; 8 P. M. Bar. 29.72; observed a little scud flying so low that it appeared to almost touch the mast-heads; squalls much harder from E. N. E.; Midnight Bar. 29.69; very thick slaty appearance all around but most to the Eastward.

Saturday, April 27th.—At anchor at the Saugor Flat Buoy. Daylight Bar. 29.51; blowing very hard; squalls from East to E. S. E. much scud flying at a

tremendous rate; 9 A. M. Bar. 29.50; blowing a heavy gale from S. E. to S. S. E. with tremendous hard squalls and rain. Noon Bar. 29.54, a hard gale from S. S. W. the clouds over head fast clearing away; 3.30 P. M. much more moderate, Bar. 29.60; 8 P. M. hard monsoon breeze from S. S. W.; Bar. 29.67.

The following notice was inserted by me in the *Calcutta Englishman* of Saturday, 27th April.

We had a heavy, oppressive, calm day on Friday, which had much the feeling of an approaching Cyclone, but the Barometer still remained high, so that all which could be said was, that if one existed in the Bay it was only coming towards us. This morning however a little after midnight the wind rose in squalls, with rain from the North East, and then gradually increased in strength till 10 A. M., when the wind, which was North East, and at times N. E. b. E. with squalls at daylight, had veered to East and E. b. S., and at noon it was E. S. E. still blowing and raining in smart and heavy squalls, showing that the Cyclone had not passed far from us, but was already to the Westward of our meridian. The remarkable part of this Cyclone, however, is that the Barometer has scarcely fallen, having only been at 29.77 at 9 A. M.; and still more remarkable, the Simpiesometer has been always higher than the Barometer by .02 or .03 up to Noon, when we are writing for our evening paper with the Barometer at 29.64; Thermometer 82¼. From all this we should infer that a Cyclone of small extent, but of considerable violence, has passed upon a track from about E. S. E. to W. N. W., or say from Akyab to about Hidgellee, near which place, or to Point Palmiras, its centre has probably passed. We shall look with much anxiety for the accounts from Kedgeree and Balasore during the next week, as well as to those from Midnapore; for to judge of the track by the strong Southerly squalls up to 4 P. M., the Cyclone has probably curved up towards Midnapore and Bancoorah in the latter part of its course.

Calcutta.

The following are my own notes at Calcutta, they are far less perfect than I could have wished them to be, but I was obliged to be absent from home on public duty, and was otherwise indispensably engaged during the whole day.*

* I wish it indeed to be understood that these memoirs, and the whole of my labours in this branch of science, are the fruits of a careful economy of my few leisure hours and often of privations of sleep and of due recreation. And this will perhaps explain to those who would desire them more perfect why, though fully conscious of their imperfections, I have been unable to render them more complete, and investigate at greater length, and by experiments and serial observations, many questions which are yet obscure. I have no time myself, and I have not the means to employ an assistant.

Calcutta, 26th April, 1850.—A heavy close calm day. Sky mostly covered with a dense mass of clouds, strata and cumulo-strata with nimbi; slight falls of rain in minute drops at intervals. The feeling of the weather was oppressive in the extreme, and exactly that of the "earthquake weather" of the Spanish Colonies; Bar. at noon 29.85.

27th April.—At Midnight it became squally with rain from the N. E.; at 2.30 A. M. blowing strong in squalls, with heavy rain; at 6 A. M. strong squalls with intervals of calm. Wind N. E. Sky clouded all over and below a dark, loose, smoky scud, flying pretty fast from N. East to S. West the upper clouds moving to about West. Some distant thunder but no lightning. Bar. 29.77; Simp. 29.80; Ther. 81½°; 9 A. M. Bar. 29.77; Simp. 29.81; Ther. 82°. Short squalls at intervals E. N. E. with heavy rain, then nearly calm; lower scud from East or even E. b. S.

By 10½ A. M. wind E. S. E.; Bar. 29.78; Simp. 29.81. Scud from E. S. E. Heavy rain at intervals. At noon no observations.

3.25 P. M. wind S. S. E. in heavy squalls; Bar. 29.70; Simp. 29.72: Ther. 82°. Scud from due South, and throughout always distinct from the upper stratum of cloud. I should judge now that the centre may be about Midnapore and that it is a Cyclone which has curved up from the South.

At 3.50 P. M. wind South. A very singular phenomenon now took place which I have noted as follows: the observations being made from the terrace of my house at about 45 feet above the ground, and with an uninterrupted view of the horizon on all sides. "Ridges of black cumuli to the Westward and a low bank of black nimbus to the East, but from the South to the Zenith and thence to the North, a clear arch of open (but *not* blue) sky was seen which might be about 50° in breadth. The colour of the clear sky was a kind of purple, or rather a black blue, for there was no shade of red in it, yet though clear it could not be called blue. This appearance is as if we saw a part of the uplifted edge of the Cyclone or the Monsoon forcing its way up below it."

At 4.30 P. M. Bar. 29.68; Simp. 29.74; Ther. 82°. Hard squalls from South. N. B.—From 12 to 4 P. M. blowing harder than from 8 A. M. to 12.

At 7 P. M. Wind S. b. W. squalls moderating. Clouds in long ridges from the S. Westward to the N. Eastward. The opening before described now from S. S. W. to N. N. E.* and a dark bank of nimbus still to the Eastward. Bar. 29.72; Simp. 29.78; Ther. 82¾°.

8 P. M. Bar. 29.74; Simp. 29.81; Ther. 82¼. A strong Monsoon gale in squalls but no rain, by midnight fine weather.

From Mr. W. SINCLAIR, *Midnapore.*

For several days before the 27th it became frequently very cloudy, the wind blowing rather steadily, or with very little variation from the south; and we

* Which would be the direction of the S. Eastern edge of the Cyclone.

could often see clouds passing at a distance from us, and the rain evidently falling from their edges, there was lightning and thunder, but no rain at this station. At length on the evening of the 26th April, we had a drizzling shower, which continued all night attended with occasional gusts of wind; in the morning it blew furiously from the North East, the rain falling nearly in a horizontal direction; the violence of the wind tore down trees by the roots, and unroofed many bungalows and huts, at least such part of the bungalows as were thatched. About afternoon the wind shifted to the South East, blowing with the same violence, and doing the same injury. During the night it veered to the West with the same force, sometimes increasing, and died away in the morning.

From the Calcutta Englishman.

Midnapore, April 29th.—"The station of Midnapore was visited on Saturday last, by a terrific Cyclone. On Friday afternoon, (the 26th,) the clouds looked heavy and lowering, and about 10 P. M. rain began to fall. It continued till 3 A. M., when it was accompanied by gusts of wind from N. E. The wind increased in violence, and about 6 A. M. shifted to the East, from which quarter it blew with unabated fury till 12 o'clock (noon), it then veered to the South, its fury still continuing, and ultimately came round to S. W. at 3 P. M., at which point it gradually subsided.

"The station is a perfect wreck; not a house, European or native, has escaped injury. Some have been totally unroofed, the walls of others have been thrown down, and the windows and doors blown in, hundreds of trees have been rooted up, and those that remain standing have been stripped of their foliage, and their branches broken and twisted into all kinds of fantastic shapes. In the park no less than 140 of the oldest peepul and banian trees have been torn up and prostrated. You cannot picture to yourself the scene of desolation that surrounds us. It is, however, a matter of congratulation that no lives have been lost. Had the Cyclone come upon us at night there is no saying what fatality might have awaited us, and how many casualties we might have had to record. We have received no tidings from the South, and await them with some anxiety, as the wind blew strongest from that quarter; it is to be feared that the Hidgelee division has suffered severely, and that the sea has destroyed the bunds. You are right, I think, in your inferences as to the track of the Cyclone, its passage was from the South or S. W., and Midnapore was about its centre."

We shall be obliged to any friends who will kindly forward us their observations on the force, duration, and direction of this storm wherever it may have passed.

Abridged note from G. W. CHEEK, *Esq. B. M. S. Civil Surgeon of Bancoorah.*

On the night of the 26th we had drizzling rain, and in the night one or two showers; at 4 A. M. on 27th a little thunder; at daylight on the 27th, we had rain with puffs of wind from the Eastward; by 8 A. M. the wind had come round to the N. Eastward more violent with frequent showers; at noon the wind was North and increasing, with heavier falls of rain; at 2, the wind was North North West and very violent and continued increasing till 5 P. M.; but at 6 P. M. it was a little more Westerly and from that time gradually decreased in violence, and at 12 at night all was quiet. I never saw a more violent gale here, it was much worse than in 1842, still the gale was worse to the S. East of this towards Basserpore, Thotulpore, Amdanga, and in the Mirzapore direction.

Due South in my range of factories it was also very violent. To the West and North West 15 miles from this they only had rain; none of my factories in the North West or West complain of wind; while in other quarters nothing but reports of roofs and manufacturing houses being destroyed have come in. In my compound upwards of twenty large trees were torn up by the roots.

I have heard that at Soonamooky and Burdwan the storm was very violent, the rivers in this part were full and at Soonamooky flooded much land.

Dr. CHEEK *has also kindly obtained for us through* J. W. MACTIER, *Esq. C. S. the Magistrate of his district, the following reports from native Darogahs (Police Officers) at various stations. They are entitled "Reports of Darogahs relative to the hurricane of the 27th April," and all relate to that day.*

Ragunatpore.—High wind nearly from E. to N. rain very heavy.

Chatra.—Hurricane began N. W. then S. and ended S. E. heavy rain, storm at its height from 11 A. M. to 2 P. M.

Condah.—Hurricane, commenced N. N. E. then N. then W. then N. at which it died away; at its height from the N. from 9 to ½ past 4 P. M.

Bishenpore.—Commenced about 3 A. M. from N. then E. then round to S. heaviest from noon to 8 P. M. At times blowing from all points, damage done very great; at this place the storm was greater than any part of my district.

Kotulpore.—Cloudy during the whole night; towards morning a drizzling rain and wind from N. N. E. then N. then E. when at its height; then S. at which it died away; at times when at E. it blew what the natives call "bindal" i. e. whirlwind.

Gomangelilie.—Not very heavy; commenced N. E., then N. when at its height then to S. when it died away.

Sitta.—Commenced N. E. then N. when at height; then W. then S. once it blew a "bindal."

Soonamooky.—Highest from the N.

Cherulia.—Does not appear to have been visited, there was a light wind from the N.

Niamutpore.—Commenced E. not heavy until 1 P. M. when it blew from the N. then W. and ceased at S.

Cokerah.—Commenced at W. then to N. to S. W. then to S. (does not appear to have been so heavy as in the Southern Thannahs).

Sendpahani.—From W. then N. then S. (does not appear to have been heavy).

Cosgaon.—Commenced N. E. then to N. when at its height, and blowing sometimes from all quarters, then to W. and declined Southerly.

Potena.—Commenced E. then N. when at its height, then E.

The duration in all the Thannahs was from 3 A. M. to 8 P. M.

The reports are all meagre, some of the Darogahs have been candid enough to tell me they were afraid to stir out.

From the above it would appear the centre was somewhere between Cosgaon and Potena, travelling N. to the E. of Soonamooky, and passing between Kotulpore and Bishenpore close to the latter.

From Barrackpore by Mr. Jas. Small.

Particulars of the gale of the 27th April.

At 4½ A. M. it blew hard from N. E. by E.; at noon S. E.; at 6 P. M. S. W. by S. and up to the hour when I retired (10¼), I could perceive no farther change in its direction. Yesterday morning, the wind was Westerly. and scarce amounted to a fresh breeze. During Saturday, the only lull I noticed (and it was not very perceptible) was between 10 A. M. and noon, Throughout the day it blew in gusts, but I fancy this is generally the case on land, although my attention has not been given to the subject. It rained frequently during the earlier part of the day, but there were no showers after one or two o'clock.

From Berhampore, by Capt. W. S. Sherwill, *B. N. I. Revenue Survey.*

Saturday, 27th April, 1850.—8 and 9 A. M. cloudy, heavy clouds drizzling rain, light wind from the *East.* 7 P. M. or sunset, heavy showers of rain with strong gusty wind from the *East*, heavy low scud flying across the heavens; a few flashes of lightning, distant and indistinct; no thunder; 8 to 11, wind increasing still from the *East*, a strong gale with heavy rain.

28th Sunday.—12 to 2 A. M. storm at its height; blowing furiously from the *East;* a deluge of rain; more water falling in these three hours than apparently

generally falls during the whole of an ordinary rainy season! The station is surrounded by and incloses numerous large tanks and jheels; these reservoirs had not been so full for many years as they were after this one storm; 3, sudden and dead calm; 4, calm; 5, sudden and strong wind from the *West* with light rain; thick overcast weather; 6, blowing hard from the *West*; 7, moderating; 8, calm, or rather light airs from the West; 9, fine weather.

N. B.—No Barometer, no Thermometer at hand, nor Pluviometer, all of which I regret much.

P. S.—Rampore Baulea on the Ganges was visited by the same storm, blowing over trees, &c. Several trees were damaged at Berhampore.

Another letter from Berhampore forwarded to me by GEO. DALY, *Esq. House Surgeon, Medical College.*

I beg to send you an extract of a letter from a friend of mine at Berhampore, where the gale appears to have been felt with great violence but only for a short time on the night of the 27th ultimo, the letter is dated the 28th April, and the writer says:—

"We had a fearful gale last night, which shook our house (a large brick building) to its very foundation. Indeed such was the violence of the wind that I had serious apprehensions about the stability of the Eastern wall; at 11 o'clock, P. M. when the storm attained its greatest degree of violence the whole Eastern side of the building vibrated so fearfully that I fully expected to see it come down. The wind was directly East and blew with such tremendous force that all the doors and windows were forced open, in spite of all our attempts to barricade them up with furniture and everything else we could collect, so that at last we were compelled to take shelter in the other side of the house and wait the result in trembling anxiety.

I do not remember so severe a gale in India since 1842. Fortunately it was not of long duration, it only lasted four hours, commenced about 8 and subsided suddenly at 12 o'clock. It has caused great damage to the gardens, large trees were blown down like reeds, and were it not for the high wall to the Eastward of our compound I verily believe we should have been blown away house and all. The wind was due East throughout.

It is calm this morning, but the sky is covered with drift having very much the appearance of a Scotch mist, so that we may not be quite done with it yet.

P. S.—2 P. M. No return of the gale, the sky is clearing up a little and the wind has veered round a point or two to the South."

The following are tabular views of the winds and weather as experienced by the ships and residents at the stations on different days, to bring into one view the various states of the weather, and assist to explain the Chart.

TABULAR VIEW OF THE WINDS AND WEATHER IN THE BAY OF BENGAL, 22ND TO 27TH APRIL, 1850.

Date.	*Name of Ship or Station.*	*Lat. N.*	*Long. East.*	*Winds and Weather.*	*Bar.*	*Simp.*	*Ther.*	*Remarks.*
1850. 22nd April.	Iron Gem.	6° 47′	87° 49′	P. M. blowing fresh in heavy squalls from N. N. W. force (7) to (6.)	..	..	..	11 P. M. lost main piece of Iron rudder, ship standing to the Northward.
	Cowasjee Family.	9° 21′	90° 03′	S. E. to East to Noon N. b. E. P. M. moderate E. N. E. 6 P. M. to Midnight N. E.	..	..	..	Squally at times. Ship standing to the N. N. W.
	Æneas.	16° 55′	90° 24′	Light variable airs W. N. W. to Midnight.	29.90			
	Duke of Wellington.	16° 19′	89° 42′	Light airs W. S. W. N. W. and N. E. and sultry. P. M. clear and red clouds.	31.20	29.77	86°	

Date.	Name of Ship or Station.	Lat. N.	Long. East.	Winds and Weather.	Bar.	Simp.	Ther.	Remarks.
1850. 23rd April.	Iron Gem.	6° 40′	88° 25′	Wind N. W. to N. N. W. at Noon. (7) to (8) P. M. (9) and W. N. W.	..	..	..	Moderating a little A. M., after which more violent. P. M. terrific squalls. Ship hove to.
	Cowasjee Family.	11° 45′	88° 24′	Strong N. E. breeze and dark gloomy weather with squalls P. M. N. East.	29.76	..	..	Moderating at 9 P. M. but increasing again at Midnight. Ship standing to the N. W.
	Brig Nereid.	16° 10′	90° 11′	Light winds Westerly to N. W. and fine.	29.85	..	87°	
	Æneas.	15° 49′	91° 01′	A. M. light airs N. E. fine and smooth water. P. M. moderate from N. to N. East.	29.80	..	86°	P. M. weather becoming unsettled from N. East to S. East.
	Duke of Wellington.	15° 18′	89° 26′	A. M. light breeze and hazy. Noon moderate at E. N. E. P. M. light E. N. E. to N. E.	30.00	29.75	86°	Sky as on the 22nd.
	Atiet Rohoman.	17° 6′	88° 54′	P. M. to Midnight light airs from North to E. N. E. and gloomy weather.		•	•	

Date.	Name of Ship or Station.	Lat. N.	Long. East.	Winds and Weather.	Bar.	Simp.	Ther.	Remarks.
							°	
1850. 24th April.	Iron Gem.	6° 37′	88° 40′	Veering to N. W. b. W. and Westerly. P. M. West. Noon force (9) P. M. (4) to (7.)	..			
	Cowasjee Family.	12° 41′	87° 52′	A. M. N. E. 6 A. M. N. N. E. 10 North. Noon hurricane from 9.30 A. M.; thunder. P. M. N. b. W. 3 N. N. W. 5 N. W. b. N. 8 N. W. Midnight W. N. W.	..	29.58	..	At 9.30 A. M. bore up and scudded S. S. W. wind North, Simpiesometer does not appear to act. P. M. hurricane and dreadful thunder with deluge of rain. 8 P M. weather moderating. High sea from the Northward.
	Brig Nereid.	14° 50′	89° 20′	Light winds N. N. E. and cloudy (3—4.) P. M. light baffling winds shifting suddenly from all quarters. 1 P. M. wind N. E. increasing 4 P. M. N. N. E. (5.) 8 P. M. N. N. E. (8.) Midnight N. N. E. (9.)	..	Noon 29.80 4 P. M. 29.75 8 29.65 Mid. 29.58	87°	P. M. thick rain, thunder and lightning. Ship running to the S. S. W. Midnight sea rising fast.

Date.	Name of Ship or Station.	Lat. N.	Long. East.	Winds and Weather.	Bar.	Simp.	Ther.	Remarks.
24th April. continued.	Æneas.	14° 00′	90° 38′	To Noon cloudy and unsettled weather and heavy swell. P. M. increasing from N. N. E. Midnight moderate gale.	29.70 3 P. M. .60 4 .50 6 .40 8 .38 10 .30 Mid. .40	..	81°	Lightning to the S. E. during the night. Noon to 8 P. M. steered S. S. W. at 8 S. W.
	Duke of Wellington.	13° 8′	88° 29′	Increasing to strong breezes N. N. E. at Noon. 1 P. M. threatening; 4 P. M. North; 6 inclining to the Westward of North; increasing hurricane to Midnight when wind N. W. to N. W. b. N.	29.90 1 P. M. .85 4 .80 6 .76 10 .79 .78	29.60 .56 .50 .46 .47 .43	83° 83° 83° 84° 84° 84°	By 4 P. M. heavy sea from E. S. Eastward. 10 P. M. deep cross sea from E. S. E. Flashes of lightning in the E. S. E. Ship scudding to S. Westward.
	Atiet Rohoman.	16° 25′	87° 54′	To Noon light airs, sunset increasing N. East.	8 P. M. 29.75 Mid. 29.75	..	..	Ship steering to the S. W. b. S.
	H. C. Surveying Brig Krishna off Preparis.	..	..	Light winds N. E. to S. E. and South and gloomy. P. M. dark and squally to S. W. Midnight fresh breeze E. N. E.	29.94 Mid. 29.90	.. ..	.. 83°	Noon, Preparis S. 30 East 10 miles; squalls with double arch. Swell from South lightning to Eastward.

Date.	Name of Ship or Station.	Lat. N.	Long. East.	Winds and Weather.	Bar.	Simp.	Ther.	Remarks.
1850. 25th April.	Iron Gem.	6° 51′	88° 52′	West force 9 to 3.				
	Cowasjee Family.	9° 45′	87° 10′	Moderating and clearing up Noon W. S. W. P. M. moderate W. S. W. monsoon.	....	..	..	Resumed course but unable to carry sail from the high confused sea mostly from the Northward.
	Brig Nereid.	12° 40′	88° 27′	3 A. M. N. N. E. (9.) 4 A. M. N. E. to N.N.E. (10.) 5 N.N.E. (10.) 6 N. N. E. (11.) 8 North (11.) 10 N. N. W. (11.) 11 N. W. b. W. (10.) Noon heavy gale W. N. W. 4 P. M. W. b. N. (9.) 6 West. Moderating; 8 W. S. W. (8.) Midnight W. S. W. (7.)	3 A.M. 29.41 4 .35 5 .30 6 .28 8 .28 10 .28 11 .30 Noon .31 4 .45 8 .60 Mid. .63	..	..	A. M. sea high but regular. Scudded to S. S. W. 5 A. M. hove too 8 scudded again. Noon hurricane in very heavy squalls at short intervals. 6 P. M. breaking up; 8 stars visible.
	Æneas.	..	..	At 2 A. M. hurricane; very unsteady gusts ending at S. East. Noon S. East decreasing.	2 A.M. 29.40	..	..	2 A. M. heavy sea rising all at once. Hard sleet and rain, vessel nearly swamped and masts cut away. Noon less sea.

Date.	Name of Ship or Station.	Lat. N.	Long. East.	Winds and Weather.	Bar.	Simp.	Ther.	Remarks.
25th April. continued.	Duke of Wellington.	10° 47′	86° 51′	1 A. M. N. W. very severe squalls. 2 P. M. clearing up a little and more moderate; 6 A. M. W. b. N. moderating to Noon. 8 W. ½ N. Noon West.	2 A. M. 29.72 6 .78 8 .90 Noon .90	29.40 .50 .60 .60	84° 84° 84° 84°	At 8 A. M. made sail.
	Atiet Rohoman.	14° 24′	85° 38′	To Noon increasing N. E. b. N. with squalls and rain in heavy gusts. 1 P. M. N. N. E.; 4 North. 6 N. N. W.; 8 N. W. 9 N. W. b. W.; 11 W. N. W. Midnight decreasing and fine.	4 A. M. 29.75 Noon .57 1 .55 5 .60	..	..	At 8 A. M. all prepared for bad weather and hove to. Wind veering occasionally to N. b. E. and N. ½ E.; At 8 bore up.
	H. C. Surv. Brig Krishna.	16° 53½′	93° 14½′	Noon moderate breeze E. N. E. to East. P. M. East. Midnight East strong breeze.	29.86 5 .74 Mid. .79	..	83½° 84°	Clouds passing from East to West long swell from S. S. E.; 8 dark and threatening to S. West. Midnight rain thunder and lightning.
	Ardaseer.	15° 07′	82° 54′	Light Northerly breezes and fine.	29.70			
	Belle Alliance.	16° 30′	83 05′	Very cloudy with appearance of bad weather. Fresh breeze at North and heavy sea from N. East.	29.73	29.45	..	Bar. on 24th 29.85 Simp. 29.43 On the 27th fine weather.

Date.	Name of Ship or Station.	Lat. N.	Long. East.	Winds and Weather.	Bar.	Simp.	Ther.	Remarks.
25th April, continued.	Neerlandsch Indie.	20° 08′	87° 53′	P. M. light winds from N. E. cloudy and rain increasing at 10 P. M.	29.93	..	86°	10 P. M. sea rising: made all preparations for bad weather.
	La Meuse.	17° 01′	87° 00′	Fresh breeze from N. E. threatening. Noon increasing N. E. to N. N. E. P. M. variable from N. E.	....	..	..	P. M. sea increasing; 4 P. M. hove to.
	Joseph Manook.	19° 53′	89° 30′	P. M. wind N. E. b. N. moderate and fine. Midnight gale from N. E.	Mid. 29.80	..	..	At 7 ½ P. M. a heavy squall from Northward.
	Rob Roy.	19° 02′	86° 24′	N. E. to N. E. b. N. steady breeze and cloudy weather; fresh gale to Noon. P. M. strong breeze E. N. E. and Easterly.	Mid. 30.15			
	Atalanta.	19° 33′	87° 38′	Noon light breeze from East and cloudy. P. M. E. N. E. 8 P. M. N. N. W.	....	..	..	By 10 P. M. threatening weather. Ship running to the S. S. W.
	H. C. P. V. Tavoy.	Outer light station.	..	Variable winds N. N. E. to East. Heavy, leaden sky.				
	H. C. P. V. Coleroon.	S. b. W. 3½ from F. L. V. in 10 fs. water.	..	Becoming threatening and squalls at times from E. N. E. to E. S. E.				

Date.	Name of Ship or Station.	Lat. N.	Long. East.	Winds and Weather.	Bar.	Simp.	Ther.	Remarks.
1850. 26th April.	Cowasjee Family.	11° 54′	87° 05′	Brisk monsoon and clear weather.	..	..	..	Heavy confused sea is still complained of, and it continues till Noon of the 27th.
	Brig Nereid.	11° 37′	88° 59′	Clear weather and fresh breeze at Noon at S. W. (5.)	29.70	..	87°	
	Æneas.	..	..	Fine weather: ship drifting to Lat. 12° 47′; Long. 88° 47′ on the 27th.	..	..	..	Clearing wreck and rigging jury masts; no observation.
	John McVicar.	17° 21′	87° 46′	2 A. M. fresh gale N. E. dark cloudy weather and rain. 4 gale N. N. E. At 9 wind North. At 11 hurricane and shift to N. W.	29.00	28.90	80°	Ship running 8 and 9 knots to the S. S. W. Barometer always falling. 11 A. M. broached to, At 4.40 Bar. and Simp. began to rise, with heavy thunder and lightning.
	H. C. Str. Enterprize at Akyab.	20° 08′	92° 55′	Variable, N. W. to North to East S. E. and S. S. E. threatening appearances and drizzling rain.				

Date.	Name of Ship or Station.	Lat. N.	Long. East.	Winds and Weather.	Bar.	Simp.	Ther.	Remarks.
26th April. continued.	Akyab.	20° 08′	92° 55′	Cloudy and Northerly wind; Noon S. West and fresh rain. 3 P. M. S. East very fresh to 8 when decreasing.	29.87			
	Atiet Rohoman.	12° 49′	85° 55′	Fine breeze West and W. b. N.	3 A. M. 29.60 Noon .70			
	H. C. Surv. Brig Krishna.	19° 19′	90° 15′	To Noon strong breeze East to E. S. E. and S. E. b. E. P. M. S. E. to South and E. S. E. at Midnight.	29.80 Mid. .78	..	85° 84°	Dark and gloomy to the South and S. S. West with a heavy South swell. Midnight, high sea.
	Ardaseer.	16° 02′	83° 53′	Fresh 7 knot breeze a N. W. b. W. decreasing with gloomy weather. 4 P. M. light airs. 8 P. M. gloomy to S. E.	Noon 29.58 4 .50 8 .37 Mid. .47	..	..	Tremendous sea, latterly heavy swell from the Eastward. 8 P. M. terrific swell from S. E.
	Neerlandsch India.	18° 4′	87° 22′	Noon wind E. N. E. 2 P. M. East blowing heavily. 5 P. M. blowing again from W. S. W. 7 hurricane.	4 A. M. 29.72 Noon .20 10 .50	..	86° 86°	Sea increasing and sky suddenly overcast. Noon sea terrific. 3 P. M. decreased suddenly to light airs East and West. 5 Renewed gale, 7 lost topmasts, &c. &c. ship in much distress. Hove to with a sail in the mizen rigging.

Date.	Name of Ship or Station.	Lat. N.	Long. East.	Winds and Weather.	Bar.	Simp.	Ther.	Remarks.
26th April. continued.	La Meuse.	18° 24′	83° 55′	Heavy squalls N. E. P. M. North. 9 P. M. N. N. W.	....	..	..	Midnight lying to under close reefed main topsail, hurricane.
	Joseph Manook.	20° 30′	89° 10′	10 A. M. N. E. b. E. 5 P. M. Wind E. N. E. 8 N. E. 10 East, gale and sea increasing.	29.90	..	..	8 P. M. hove to; wind N. E.
	Rob Roy.	..	..	Breeze increasing to strong gale and heavy sea. At Noon N. E. b. E. and N. E. P. M. very strong gales. 7 P. M. North.	4. 30.10 10. 29.71 Noon. .70	..	..	Position not given. P. M. heavy rain and high sea. At 11 P. M. blowing terrifically; shifted cargo and ballast.
	Iskunder Shah.	18° 30′	85° 15′	Noon weather threatening; sunset wind E. N. E.	29.70	..	..	Bar. had been at 29.70 for the last ten days.
	Atalanta.	16° 10′	85° 47′	Daylight increasing gale and sea. 11 A. M. sudden shift to the Westward.	29.40 3 P. M. .50	..	..	Carried away three topmasts and mainmast; had cargo shifted, ship in great distress. P. M. hove to. On 27th moderate and fine.
	False Point.	20° 19½′	86° 59′	Noon commenced to blow from the Eastward in heavy squalls. 5 P. M. S. E. 7 South. Midnight S. W.	8 A. M. 29.80 Noon. .78 Mid. .60	..	80° 82° 80°	Moderating at 9 P. M. to a calm at Midnight.
	Balasore.	21° 28′	87° 12′	Light breeze N. E. threatening weather and rain: 9 freshening North and East.	2 P. M. 29.70 5. .60 10. .50	..	86°	Barometer falling till 5 P. M. on the 27th. Puffy throughout the night with lulls at times.

Date.	Name of Ship or Station.	Lat. N.	Long. East.	Winds and Weather.	Bar.	Simp.	Ther.	Remarks.
26th April. continued.	Near JELLASORE.	..	..	Fresh Easterly gales and rain throughout.				
	H. C. P. V. Tavoy.	20° 23′	88° 27′	1 A. M. increasing gusts from N. E. daylight gale from N. E. P. M. gale at East.	29.77 to 29.47	30.05 to 29.56	..	Aneroid 29.94 to 29.65; standing to sea from the F. L. V. Wind increasing and oscillating from N. to N. E. in first part of the 24th.
	Beacon F. L. V. Outer Station.	..	..	4 A. M. strong N. E. breeze and cloudy. 8 Easterly increasing. Noon N. E. 8 P. M. E. N. E. Midnight heavy gale E. N. E.	29.74 to 29.60 at Noon.	..	80°	7.30 A. M. veered to 155 fs. wind and sea increasing.
	H. C. P. V. Coleroon.	Close to F. L. V.	..	Daylight strong gale from N. E. Midnight E. S. E.	4 A. M. 29.87 Noon. .83 Mid. .64	..	..	Veered to 200 fs.
	Barque Champion.	Kedgeree to Saugor Flat Buoy.	..	N. E. to East blowing hard. P. M. E. N. E. hard squalls.	8 A. M. 29.80 8 P. M. .72 Mid. .69	..	..	Thick slaty appearance, strongest to Eastward; peculiar gusts of wind; at times almost calm P. M. low scud.
	Calcutta.	..	..	Heavy close weather sky overcast and calm throughout, till about 10 P. M. when the wind rose in slight squalls.	29.85	..	..	Very oppressive, a few drops of rain at intervals.

Date.	Name of Ship or Station.	Lat. N.	Long. East.	Winds and Weather.	Bar.	Simp.	Ther.	Remarks.
1850. 27th April.	H. C. St. Enterprize leaving Akyab.	20° 9½′	92° 12′	Steady breeze and cloudy from E. S. E. and S. Eastward. Midnight steady breeze S. S. E.	29.90 A. 30.02*	30.00	82°	Heavy sea from S. S. E.
	Akyab.	20° 08′	92° 55′	Midnight S. E. and E. E. S. E. Noon fine.	29.90	..	..	
	H. C. Survey Brig Krishna.	About 25′ E. S. E. of Light vessel.	..	A. M. increasing gale E S. E. 1 S. E. S. S. E. and S. b. W. at Noon. P. M. moderating.	29.69	..	84°	A. M. high sea, rain, lightning and thunder. 3 A. M. laid too.
	Ardaseer.	17° 05′	86° 00′	Breeze from S. S. E. and fine.	29.70	..	87°	
	Neerlandsch Indie.	18° 02′	87° 59′	Decreasing and weather becoming fine.	29.80	..	86°	Placed in 18° 10′ upon the chart to avoid confusion.
	La Mense.	18° 05′	87° 32′	W. b. N. 5 A. M. West decreasing rapidly. P. M. wind S. W.	....	..	..	
	Joseph Manook.	..	..	A. M. S. E. 2 S. S. E. 3 South heavy gale and sea. 8 P. M. moderating.	29.40 P. M. 29.36	..	..	

* The Aneroid.

Date.	Name of Ship or Station.	Lat. N.	Long. East.	Winds and Weather.	Bar.	Simp.	Ther.	Remarks.
27th April, continued.	Rob Roy.	19° 29′	87° 06′	Wind hauling to the Westward and abating at 2 A. M. 4 A. M. W. S. W.	29.79			
	Iskunder Shah.	18° 00′	86° 10′	2 A. M. strong gusts; daylight gloomy. 7 A. M. wind N. W. Till Midnight hurricane, when abating fast.	2 A. M. 29.60 9 .29 7 .45	..	..	Daylight hove to; lost topmasts, &c. in a heavy burst of the hurricane.
	False Point.	20° 19½′	86° 59′	3 A. M. recommenced to blow from N. W.; hurricane to 5 A. M.	....	..	..	Country around inundated.
	Balasore.	21° 28′	87° 12′	Increasing gale; 6 N. b. W.; blowing hard. 7 N. W. 8 W. N. W. 9 A. M. West. 9½ W. S. W. gale breaking. At 11 A. M. lulled entirely.	3 A. M. 28.90 7 .80 8 .75 8½ .69 9½ .73 10 29.01 11 .60	..	..	Blowing heavily from 3 or 4 A. M. with heavy rain; wind sweeping away trees and native houses.
	Near Jellasore.	..	..	Daylight strong gale N. E. to East. 10 A. M. lull and shift. Strength of gale between 11 and 12.	....	..	..	Much rain; at 10 A. M. a lull in which the wind shifted to Westward, and broke up at W. N. W. at 3 P. M.
	Beercool.	..	..	3 A. M. hurricane from N. E. to Noon when about East and P. M. to the Southward of East, and South.	....	..	..	On the 26th strong breeze from the N. East, increasing till it became a hurricaue at 3 A. M.

Date.	Name of Ship or Station.	Lat. N.	Long. East.	Winds and Weather.	Bar.	Simp.	Ther.	Remarks.
27th April. continued.	H. C. P. V. Tavoy.	20° 31′	87° 52′	East to S. E.; 2 A. M. hurricane with terrific sea; 3 S. E. 7 S. S. E. 1 P. M. South; 6 S. S. W.	29.41 to 29.37 at 3 A. M. 29.68 at 10 A. M. 29.80 at 8 P. M.	29.50 to 29.44 29.91	80°	Aneroid 29.59 to 29.44 and again to 29.83.
	H. C. P. V. Coleroon.	Station.	..	Daylight hurricane from E. S. E. Noon veering to South and abated at S. W.	2 A. M. 29.59 6 .54 Noon .68 6 P. M. .80 Mid. .86	..	..	Tremendous heavy sea constantly breaking over the vessel.
	Hidgellee.	..	..	Daylight blowing with unusual force from the East. At 9 hurricane. 11½ shift to the South, less violent, and P. M. to the S. W. abating.				
	Barque Champion.	Saugor Flat Buoy.	..	Hard squalls E. to E. S. E.; 9 heavy gale S. E. to S. S. E. Noon the same S. S. W. 3.30 P. M. more moderate. 8 P. M. monsoon breeze.	7 A. M. 29.51 9 .50 Noon .54 3,30 .60 8 .67	..	..	Daylight much scud flying. Noon clearing overhead a little. P. M. more moderate; 8 P. M. monsoon gale.
	Calcutta.	..	..	Midnight squally from N. E.; 2,30 blowing strong N. E.; 10½ E. S. E.; 3,25 P. M. S. S. E.; 3,50 South. 7 P. M. S. b. W.	6 A. M. 29.77 10 .78 3,25 P. M. .70 7 .72 8 .74	29.80 .81 .72 .78 .81	81 h. 82° 82½°	Remarkable intervals of almost calms between the squalls, particularly before Noon. From 12 to 4 P. M. bowing harder than from 12 to 4.

Date.	Name of Ship or Station.	Lat. N.	Long. East.	Winds and Weather.	Bar.	Simp.	Ther.	Remarks.
27th April, continued.	Midnapore.	..	..	3 A. M. N. E. in gusts increasing in violence. 6 A. M. East. At Noon veered to South and at 3 P. M. to S. W.				
	Bancoorah.	..	..	Daylight rain and puffs of wind from the Eastward. 8 A. M. wind N. E. Noon North, increasing and heavy rain. 2 N. N. W. very violent. 6 P. M. more westerly and decreasing. Midnight calm.	..	..	..	4 A. M. thunder.
	Barrackpore.	..	..	4½ A. M. blowing hard from N. E. b. E. Noon S. E. 6 S. W. b. S.				
	Berhampore.	..	..	8 A. M. cloudy, heavy clouds and drizzling rain, light wind from East. 7 P. M. strong gusty wind East. Increasing to midnight from East.	..	..	..	7 P. M. a few indistinct and distant flashes of lightning. From 12 to 2 A. M. of 28th Cyclone at its height from East. 3 A. M. (28th) calm and shift to the West blowing heavily up to 6 A. M.

Barometer and Thermometer at Calcutta at the Surveyor General's Office. Bar. reduced to 32° Fahrt.

Date.	Sun Rise.		9 h. 50′ A. M.		Noon.		2 h. 40′ P. M.		4 P. M.		Sunset.	
1850. April	*Bar.*	*Ther.*	*Bar.*	*Ther.*	*Bar.*	*Ther.*	*Bar.*	*Ther.*	*Bar.*	*Ther.*	*Bar.*	*Ther.*
26th,	29.770	78.3	29.831	83.3	29.809	87.9	29.754	87.3	29.746	84.9	29.755	81.
27th,	.674	77.8	.657	79.8	.642	30.0	.568	81.9	.535	81.8	.571	82.2
28th,	.760	78.1	.818	85.3	.800	88.0	.751	86.8	.735	87.3	.734	84.8

(To be continued.)

On the Rates of Chronometers, *as influenced by the Local Attraction of Ships, and by Terrestrial Magnetism.* By Henry Piddington, *President of Marine Courts, Calcutta.*

In the latest and best English treatise on Navigation, that of Lieut. Raper, R. N. 3rd Edition, 1849, p. 174, after briefly referring to various opinions as to the causes of the variation of rates in Chronometers, such as motion, temperature, shocks from guns, thunder-storms, magnetism, &c. the author says that, "it seems generally admitted that the principal cause of the change of rate is variation of temperature" and he adds that "as regards the local attraction (deviation) of the ships themselves affecting the rates, no decisive experiments appear to have been made on the point." I have thus thought that where good experiments have been casually made, it becomes of much importance to Nautical, Hydrographical and Geographical science to preserve the records of them.

Before detailing the particular instances to which this paper refers it may be useful to give a brief sketch of what is known and has been done to elucidate this most important question up to the present time, so far as the limited means of Indian research enable me.

The earliest accounts we have of the effect of Magnetism on Chronometers, whether Terrestrial or Local, is I think that of Mr. Varley in the Philosophical Magazine, Vol. I. (1798) who discovered that the balances acquired polarity at two opposite points on the rim, and thus that the going of the time-piece was affected *by the position of*

these poles with respect to the magnetic meridian, Mr. Varley moreover found that every new balance which he tried was already more or less polarized!

His communication dates in 1797, but from this time to 1820 which is the date of Mr. Fisher's* paper read by Mr. Barrow to the Royal Society (Phil. Trans. Vol. CX.) I have not found any farther published notices of this phenomenon, though skilful navigators were well aware of the tendency of Chronometers to take on "sea rates;" usually accelerated ones; and the practice was both to correct by the run to Madeira or Teneriffe if seen, and to give a "lunar rate" also. Mr. Coleman, an old Company's Officer and now an eminent teacher of Mathematics in London, has given a number of tables of rates given on shore with those found at sea with the Chronometers of various ships, mostly of those of the E. I. Company, from 1802 to 1820; distinguishing the iron from the copper-fastened vessels, but he draws no general results.

Mr. Fisher's paper, after shewing the tendency of Chronometers to take on accelerated rates, describes the remarkable effects on the rates which were found on landing them on Spitzbergen† which with one amounted to a difference of thirteen or fourteen seconds daily, and another returned to its exact London rate! Mr. Fisher also quotes Lieut. (Sir John) Franklin, as remarking that it is to this circumstance we must attribute the error of the whole of the line of Coast on the West side of East Greenland being laid down $1\frac{1}{2}^{\circ}$ too much to the Westward by Captain Phipps (Lord Mulgrave) in 1770; and that in the first trial of Harrison's Timekeeper in 1764, the Longitude of Barbadoes was $10'\ 45''$ more to the Westward than the astronomers sent out for the purpose made it. Mr. Kendal's watch made on the same construction as Harrison's, and sent out with Captain Cook (1772 to 1775) went much better than Harrison's, but its only fault was "that its rate of going was continually accelerated."

Mr. Fisher attributes the acceleration to "the magnetic action exerted by the iron of the ship on the inner rim of the balance which

* Mr. George Fisher, Master of H. M. S. *Trent*, on the North Polar expedition under Capt. Buchan.

† The nature of the rock or soil on which the temporary hut for keeping them stood, is not adverted to. We shall presently see that this was of importance.

is made of steel," and he made several experiments upon Chronometers with magnets, to confirm his views.

In 1821, Professor Barlow, at Woolwich, made a very complete series of experiments, shewing that the vicinity of masses of *unmagnetised* iron invariably affected the rates of Chronometers placed near them; and he rightly suggests that such variation can only be supposed to arise when the balance has acquired some polarity; but it is curious to find that Professor Barlow was evidently not acquainted with Mr. Varley's paper as quoted above, which had exactly *proved* so long before what he so acutely conjectures! He even goes on to propose Mr. Varley's experiments on a detached balance, but does not make it!

Professor Barlow's paper appeared in the Philosophical Transactions for 1821, and a *resumé* of it is given in his celebrated Essay on Magnetic attractions of which the second edition, now before me, was published in 1823.* Lt. W. Mudge in the Edin. Phil. Journal for 1821, p. 381, describing the peculiar magnetic deviations found on Mayo and the Great Salvage, as also an instance where the compasses of a Hudson's Bay Company's vessel became suddenly affected at sea in 62° N.; 93° West; relates also that one of the surveying party on the Great Salvage having laid down his watch on the rock in the morning, found when he took it up again, in the afternoon, on his return to the same spot, that it had gained two hours in the interval "an acceleration doubtless due to the action of the magnetic rock on the balance." In our Journal, Vol. XVIII. p. 410, will be found Capt. Campbell's account of a very remarkable local deviation of the compass at Saugor in Bundlecund, by which a boulder of magnetic Diorite rock was found buried in the earth when dug for at my suggestion, with my remarks.

In the Nautical Magazine for 1837, Mr. Fisher, adverting to a

* Professor Barlow states, p. 126, "that a Master in the Navy to whom he had described his experiments told him that, when master of a first rate, he found that his Chronometer 'which was an excellent one invariably altered its rate 5' when taken on board, but that he could now account for the difference, recollecting that he had placed his Chronometer nearly in contact with an iron knee." The same perplexing fact occurred to myself with a fine box Chronometer in 1817. In the Nautical Magazine for 1845, an instance is given by Captain Wise of the *City of Derry* in which an error of 90 miles between Java Head and Cape Lagullas occurred with an excellent Chronometer near to which a pair of pistols had been placed!

communication in No. 15 of the same work (to which I cannot refer) in which it is stated by Messrs. Arnold and Dent as one of the results of their experiments that the rate of a Chronometer was sensibly affected by terrestrial magnetism when it was moved in Azimuth; details a series of experiments shewing clearly the effect of terrestrial magnetism on Chronometers; of which the rates were first ascertained when the arms of the balances were nearly in the position of the XII. and VI. on the dial plate, and then when these figures were alternately placed towards the North and South and East and West; the differences amounting to + 0.42 and + 0.35; when the North (XII.) was reversed to South; and to + 0.28 and + 0.22 when they were changed from West to East!

The same paper also contains a communication from Mr. Northcote, Master of H. M. S. *Jupiter*, shewing the influence of the ship's magnetism on the rates of her Chronometers in a voyage to and from the East Indies.

And finally, Professor Airy of the Royal Observatory at Greenwich (Naut. Mag. for 1840, p. 231), after describing his observations and experiments upon a Chronometer which had been sent to him from Messrs. Brookbanks & Co., "as particularly magnetic," gives rules for correcting the effect of terrestrial magnetism on a Chronometer by simply placing it on the top of the glass of a compass box. No experiments seem as yet to have been made as to obtaining any correction for the *ship's* magnetism. I do not find this subject referred to by the editor of the latest edition (1848) of Bowditch's American Navigator; and this then appears to be, from all the authorities to which I can refer in India, the present state of our knowledge as to the phenomenon itself, and the causes and means of correcting it.

My friend Captain Hopkins, of Messrs. Green's ship the *Prince of Wales*, called upon me in January to mention that he had experienced in his outward bound voyage of 1850-51, a remarkable alteration in the rates of his Chronometers; which though first rate ones and always performing well on former voyages he had found to be upwards of forty miles wrong by his lunars on his arrival at the Floating Light! This he was at a loss to account for, as it had never occurred before, the shore rates given in England having always been within a trifle correct.

I suggested that this might be owing to an increase in the ship's local attraction if she had a larger proportion of iron in her cargo on the present voyage, or her usual quantity differently placed? This he also thought probable, and stated that he *had* had more Iron on this voyage, and moreover mentioned that the same variation of rate had occurred on board of other ships which had brought out a large quantity of iron. I thought this is a question of much interest both to seamen and to hydrographical science, and I forthwith drew up a set of queries on the subject, to which Captain Hopkins of the *Prince of Wales*, Captain M^{c}Leod of the *Queen* and Capt. Lay of the *Tudor* have obliged me with replies. All these are large passenger ships; the *Tudor* brought out *less* iron on this voyage than usual and also found her Chronometers in error, but the causes of this will be seen in the reply to query No. 10. In a note to me Capt. Lay says, "I had more difference than usual, and one Chronometer became quite useless which has been my best going one for 13 years." I have printed these replies as follows, distinguishing Captain Hopkin's replies by the letter H. Captain M^{c}Leod's by M^{c}L. and those of Capt. Lay by L., and I have preferred to give them with the queries, because they may be useful on a future occasion, or suggest other enquiries or hints as the subject is more developed; for it is evidently one of high importance and of which we have yet much knowledge to acquire, and which offers a wide field alike for the careful observer of all classes and for the ingenuity of the scientific workman in the construction of these invaluable instruments.

Queries for ascertaining the cause of the alteration in the Rates of Chronometers on board the ship —

GENERAL.

1. What was the whole error of your Chronometers on the voyage taking the mean of the two or three best of them and if + or — of the shore rate. State how many miles (of arc) you were East or West of the Light Vessel or other position?

H.—Forty miles East of the true position of the Floating Light Vessel.

M^{c}L.—53$\frac{3}{4}$ miles East of Calcutta by mean of 3 Chronometers.

L.—The variation from true rate was 0h. 2′ 7·2″. 32 miles.

2. Do you consider that error as due to a constant rate?

H.—I think the rates altered more after passing the Cape.

McL.—I believe it to have been a uniform rate throughout, since leaving, with the exception of one watch which was materially affected by temperature.

L.—No.

3. Did you see Madeira, or the Cape De Verds, or Tristan D'Acumha, to ascertain your measured differences of meridian by Chr. and hence the alteration up to that time?

H.—I did, but not near enough to take correct bearings.

McL.—I saw the Islands of Trinidad and Martin Vas on the 21st October, and found the means 20′ to 25′ East of the truth. I obtained the cross bearings of the two Islands having constructed a chart of their locality on a large scale for the purpose, and under favourable circumstances obtained my position, and thence an entire new rate for my Chrs. which rate on arrival only varied as follows: No. 1, + 20″; No. 2, + 28″.6; No. 3, 6″.4 being an error of 3′ ¾ of the truth. L.—No.

4. The same to Ceylon?

H.—Not seen. McL.—Not seen. L.—No.

5. Did your lunars also shew a steady alteration of rate in the Chrs. or did they shew that it began from a certain epoch as from the Cape?

H.—Yes. McL.—Lunars from 25′ to 30′ to the Eastward. L.—No. Variable.

6. Are your Chrs. placed this voyage as in former ones, or is there any alteration?

H.—None. McL.—Have been placed for eight years in the same place. L.—The same.

7. Any iron knees, arm stands, &c. near your Chrs. in their new berth this voyage?

H.—None. McL.—None. L.—No.

8. Had you any very severe thunder storms on the voyage? and do you think the rates may have altered from that time?

H.—None. M^{c}L.—Never had fewer.—L.—No.

9. Can you think of any other cause which may have affected your Chronometers? and to what do you principally attribute the error?

H.—I think, to the quantity of iron on board.

M^{c}L.—To a large quantity of iron, never having before had so large a quantity. L.—No; I cannot say.

10. Had you any alterations in the iron fittings of the ship this voyage near the Chrs.?

H.—None. M^{c}L.—None. L.—*Only one large iron bolt from deck to deck.*

11. Have you had your Chrs. rated here? and how is the Calcutta with the London rate?

H.—As. *(Mss. illegible.)*

M^{c}L.—Rates as follows:

Leaving London.	Found in Cal.
No. 318 — 2″.6	— 3.3
320 + 2″.0	+ 0.7
333 — 2″.7	— 0.2

Altered from losing to gaining, difference one second eight tenths, per day (1″.8).

CARGO.

12. What quantity of bar iron and steel had you on former voyages and what on this?

H.—Little compared to this voyage. M^{c}L.—This year 500 tons: Former years 250 to 350 tons. L.—400 to 500 tons; on this voyage 100.

13. What quantity of machinery and arms more than on other voyages?

H.—No machinery, no arms. A large number of casks of nails.

McL.—No machinery, but 200 cases of small arms, besides iron. L.—No more.

14. Where was the bar iron stowed?

H.—Principally in the main hold. M^{c}L.—From about 12 ft. abaft main hatchway to about 14 ft. abaft after hatchway, but the

bulk in the main hold; 16 iron water tanks over the iron immediately under where the Chrs. stood. L.—Main hold.

15. Where were the tubs of steel, arms, &c. stowed?

H.—None. M^{c}L.—Arms in the after hold. L.—None.

16. Whereabouts do you consider the centre of the mass of your iron, steel, and arms to have laid? Say how many feet abaft or before the mainmast?

H.—Abreast the mainmast and a little before and abaft it. The Chrs. over it, in my cabin, abreast the main mast. M^{c}L.—The centre of the ship; the Chrs. being abreast the mainmast on the middle deck. (*Queen* is a flush ship). L.—About 10 feet before the mainmast.

17. Had you any particular quantity in the afterhold?

H.—Not a large quantity. M^{c}L.—About 150 Tons. L.—No.

18. And nearly under the Chronometers?

H.—A large quantity. M^{c}L.—The greater proportion. L.—No.

19. Have you iron tanks for water? and have you altered the stowage of them on this voyage?

H.—Iron tanks in the same place. M^{c}L.—No. They were placed under the square of the after hatchway across the ship. L.—Yes. No.

20. Had you any quantity of cases of cutlery on board this voyage? and where stowed?

H.—None. M^{c}L.—200 cases of small arms and musquets. After part of afterhold. L.—No.

Deviation.

21. Have you ascertained the deviation of your compasses in England when ready for sea?

H.—No. M^{c}L.—No. L.—No.

22. Or at sea?

H.—No. M^{c}L.—No, L.—They varied from a point to half a point with each other.

23. And here in Calcutta since discharging cargo?

H.—No. McL.—No. L.—No.

24. Did you experience any remarkable currents, i. e. differences of Acct. and Chr. for 24h. and was any allowance for the deviation of your compasses made in your D. R?

H.—None. McL.—None. L. No.

25. Did these Log-Book currents appear to prevail more when the ship was standing on any one rhumb more than on another?

H.—No replies.

26. Give averages of your remarkable Log Book currents, and note how standing at those times if you can.

H.—No replies.

FINAL.

27. Do you ever recollect instances of such remarkable alterations in the rates of your Chr^s. before?

H.—Never so great an error. M^cL.—Yes, when on a former occasion carrying iron to a large extent.

28. Of those of other commanders?

H.—No reply. M^cL.—Capt. Nash of the *Maidstone* complained of the same, and having signalized with several ships, I found them all to the Eastward of my reckoning after having made my corrections. All more or less carrying iron this year.

29. Do you recollect any instances of the kind in print?

H.—None. M^cL.—None.

The replies to the foregoing queries seem to be exactly a confirmation of my supposition that Captain Hopkin's and McLeod's Chronometers *were* affected by the large quantity of iron on the *Prince of*

Wales and *Queen;* and the *Tudor* has fortunately given us an instance which, though without careful enquiry it would at first seem to contradict the other two cases, is both explained by that enquiry and offers a good confirmation of the whole theory: the single massive bolt near the Chronometers being probably a vertical magnet, or as a mere mass of iron producing as much mischief as the whole mass of cargo iron at a distance from them in the body of the other ships. But to set the question before the readers of the Journal in all its bearings, we have some farther considerations to take into account; for "Chronometers are seldom or never found to have the same rate at the end of a voyage that they had at its commencement" says a high authority:* And this indeed is known to every one who has used them.

I was informed in the course of some enquiries on this subject by Mr. Black, of the firm of Black and Murray, Watch and Chronometer makers of this city, that there is a very general complaint, and indeed that it is almost constantly found, that the London or Liverpool rates given with ships' Chronometers prove incorrect ones on the voyage out; but that the Calcutta rates found on their being landed here are usually about those determined by the lunars on the voyage, and the whole run from England to the Sand Heads; (Mr. Black is speaking especially of the Chronometers of the first rate passenger ships and traders to the port, most of which come into his hands for rating, and are watches of the best description;) and he adds that it is usually found that the Calcutta rate is a perfectly correct one back to England, and even that on the next voyage though a London or Liverpool rate is given with the Chronometer this is usually found incorrect, and many Commanders take up the old Calcutta rate of the last voyage and carry it on, and find it the correct one!

This would appear singularly to complicate the problem. Let us see how many conditions are to be taken into account to solve it; assuming of course that the rate is as carefully determined in London and Liverpool as it is in Calcutta these are———

1. Carrying the Chronometer from the watchmaker's on board the ship?

* Capt. Bayfield, R. N. "On Rating Chronometers," Nautical Magazine, 1843, p. 320.

2. Effect of the ship's local attraction, from her iron-work and guns upon a polarized balance, in a man of war?

3. Effect of the cargo and iron work in a merchantman?

4. Vicinity to or bearing of, or direction of ship's head in regard of the magnetic poles, augmenting the effect of terrestrial magnetism in any ratio more than a direct one as the latitude is increased?

5. Distance from the magnetic equator?

6. Opposite effects of terrestrial magnetism in Northern and Southern hemispheres; so much (three-fourths) of the voyage to India being performed in the Southern hemisphere.

7. Difference of cargo out and home. (Accounts for rates being more permanent homeward.)

8. Whether there be not a local magnetic effect in London, Liverpool and in all great cities and towns? arising from the enormous masses of common and polarized iron in them?* a minute one of course, but sufficient to cause a variation of rate? We have comparatively very little iron at Calcutta?

Let us consider these conditions separately:—

1. *Carrying the Chronometers on board.* Except where the Chronometer is regulated near the docks, no doubt many chances of deranged rates may arise from this source; for between the jolting of a conveyance and the obstructions from passengers if on foot, the conveyance of a box Chronometer is always a delicate and a difficult undertaking in the streets of London or Liverpool.

2—3. *The effect of the ship's local attraction and of her cargo* we have already considered, and the facts now brought forward seem to place it most unequivocally and beyond any doubt as one of the leading causes of the irregularity.

4—5. *Magnetic poles and Magnetic Equator.* Assuming that terrestrial magnetism affects the balances of Chronometers, of which

* All iron which remains long in a vertical position as a rail or the bar of a window, becomes magnetic. There are millions of bars of iron so placed in London, to say nothing of as much more in other positions; the railings are, it is true, of cast iron, which affects the compass least; but their prodigious number and with those which have stood from a quarter of a century to a whole century or more, their increased magnetism; which must go on to saturation, one would suppose? may place them as high as wrought iron or blistered steel.

there can also be no doubt; it is highly worthy of notice that on any usual voyage from England, South of the Equator, and consequently on a Brazilian, East India, China, or Cape voyage, the ship crosses near to the spot (about Bahia, say in 13½ South Lat. and 35° West Long.) where the Magnetic Equator crosses the line of No Variation; or in plainer words where there is no dip or variation; whereas in England the variation may be called in round numbers 24° and the dip 70°.

The Chronometer is rated in England under these strong influences, and every day's sail from England rapidly diminishes them to the Magnetic Node above alluded to. They then increase again (but in an opposite hemisphere) and for a short time, from Trinidad to a few degrees East of the Cape where the line of dip of 60° intersects that of 30° Westerly variation, they become high, but they rapidly decrease again until the ship reaches the Bay of Bengal, where she again crosses the Magnetic Equator and is not far from the line of No Variation, having but a very feeble one of 2° or 3°.

At Calcutta the Chronometer is rated under 2° or 3° of variation only and 20° of dip, or about the mean of that last influence for the whole voyage; if it has *any* influence? and in a city comparatively free from iron as compared with those of Europe; and it is carried but a few hundred yards to place it in the boat which conveys it on board a ship, of which no part of the homeward bound cargo is magnetic. All these circumstances are no doubt in favour of the Calcutta rates; but whether it be the accidental causes, such as cargo, &c. or the permanent ones such as the terrestrial magnetism which give this advantage to the Indian rates it is difficult and at present indeed impossible to pronounce. It will probably be found that both influence the result. The fact, in which every confidence may be placed, is one of the highest importance to the right understanding of this anomaly.

In regard to the permanent causes, we have again to consider, in reference to Messrs. Arnold and Dent's experiments alluded to at page 63, and the results stated by Mr. Northcote, how the arms of the balance may have been placed with reference to the magnetic meridian while rating, and how they would be placed on board the ship. The first of these conditions probably varies at every maker's, according as the house, or shop, or room used for rating, is placed; but on board ship the XII-VI. is usually, in the present day, and in large ships, placed

in a line with the keel; in Mr. Northcote's experiments however it was placed at right angles to it, and *against the side*, (which side, is not said) and this again throws much uncertainty upon the results, for the bolts, which would be hidden by the lining of the Chronometer-room or cabin, might have affected the balances. We may suppose the balance to be so hung that, when at rest, the arms coincide with the XII. and VI. hour marks. The line of the keel from the Channel to the Magnetic Node in 13½° S. will generally be not far from a line at right angles with the lines of variation, thus allowing this influence to have its full effect whatever that may be; and after passing this point it will be at first, and until Trinidad is reached, nearly *upon* the lines of variation, and then again gradually approach to a right angle with them, not being perhaps at less than 45° till Amsterdam and St. Paul's are passed; after which it will be gradually approaching the magnetic meridian with a very low variation, until the ship's arrival at Calcutta.

On the homeward bound voyage from India however the case is different. The ship leaves Calcutta with Chronometers rated under very favourable circumstances as regards terrestrial magnetism, and without cargo to affect the rate, which is thus only disturbed by her local Deviation,* and until near the tropic of Capricorn experiences but little terrestrial variation, too weak indeed, as we may suppose, to affect the balance, as it does not exceed 5° to 10°; though it is gradually becoming stronger, and at right angles to the line of her keel, or the line of XII. VI. Upon her crossing the southern tropic, say in 65° East, we may call the variation 15° at right angles to the keel, and the dip 55°; and from hence to past the Cape the variation is constantly rising to 30° and nearly at right angles, but the Cape once passed the whole distance to the latitude of 30° North and to the West of the Azores, is nearly upon the magnetic meridians! but at this point, with a high variation, the keel (XII. VI. line) is again thrown gradually round as she passes the Azores and until the ship's arrival in England is nearly at right angles to the magnetic meridian.† In the Appendix to Vol. II. of the Survey-

* My friend Capt. Henning, of Messrs. Green's ship, the *Alfred*, has obliged me with a note of his local variation (deviation) as observed in the Hooghly, and it amounts only to about 5° on a mean.

† And the Cape and Channel are the two points at which we so frequently hear of accidents from the Chronometers being wrong. I mean of course blundering

ing Voyage of H. M. S. *Adventure* and *Beagle*, p. 345, Captain Fitzroy says—speaking of his chain of Chronometric measurements round the globe (the italics are mine) that—

"It ought to be clearly stated, however, that the sum of all the parts which form the chain amounts to more than twenty-four hours, therefore error must exist somewhere; but what has principally caused the error, or where it may be said to exist, I am unable to determine. The whole chain exceeds twenty-four hours, in about thirty-three seconds of time."

"It appears very singular, that the more the various links of this chain are examined and compared with other authorities, the more reason there seems to be for believing them correct, at least to within a very small fraction of time; and even allowing that each link were one or two seconds of time wrong, it does not appear probable that all the errors would lie in one direction, *unless some hitherto undetected cause* affects Chronometers when carried Westward, which might affect them differently when carried Eastward."

"It would ill become me to speak of any value which may be attached to these Chronometrical measures; even erroneous as they undoubtedly are in some part, if not to a certain degree almost every where. I can only lay the honestly obtained results before persons who are interested in such matters, and request that they may be compared with those of the best authorities."

* * * * * *

"The only idea I can dwell on, with respect to the cause of this error of thirty-three seconds, is, *that Chronometers may be affected by magnetic action in consequence of a ship's head being for a considerable time towards the East or West:* yet this is but a conjecture. In the measures between Bahia and Rio de Janeiro, and in those between Rio de Janeiro and Cape Horn, there is no evidence of any permanent cause of error; but the greater part of those measurements were made with the ship's head usually near the meridian."

As to the Chronometers of H. M. S. generally, and those of the *Adventure* and *Beagle* in this instance, we know that they are rated at the Observatory at Greenwich, where every precaution is of course taken, and where they are free from the influence of any of the London masses of iron. It farther appears that the rate of the *Beagle's* Chronometers

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or fine weather strandings; not those through sheer stress of weather. And I do not forget that they are the only two landfalls, excepting St. Helena and Ascension, on the voyage. As an opposite extreme we may take the Western entrance to Bass' Straits which is crossed by the line of no variation, so that here the Terrestrial Magnetism (apart from the dip) has no influence. But the error of the watches was accumulating from off the Cape.

was materially altered by the ship's local attraction, for which of course due allowance was made in the measurements. Captain Fitzroy after describing the precautions taken to place them near the centre of the ship, and mentioning that the local attraction must always have remained the same, says—p. 320.

"After the Chronometers had been carefully rated at the Observatory, they were embarked on board H. M. S. *Adventure*, on the 23rd April, 1826; but as the ship was detained at Deptford and Northfleet until the 4th May, an opportunity was offered of ascertaining what change had been produced by the alteration of the place; and it turned out to be no means inconsiderable. Five of the watches had accelerated, and the remaining four had retarded rates. It would be difficult to assign any other reason for this change than the effect of the ship's local attraction."

So far Captain Fitzroy, but from the sketch chart of the *Beagle's* voyage prefixed to the volume now quoted, it would appear that leaving England, she first crossed the Magnetic Node on her passage to Bahia and Rio Janeiro. She then increased her variation to 20° or 25° East (which from England was a difference of nearly 50° in the whole though acting in opposite directions) when surveying Terra Del Fuego, and afterwards when approaching Lima reduced it to 5° East; crossing the Magnetic Equator again.

From the coast of South America to the Galapagos, and thence to the Society Islands she had not above 5° of variation, and would cross the Magnetic Equator a third time, increasing thence her variation to 15° at New Zealand; the line of it being not far from that of the keel, and then rapidly decreasing it, nearly to Zero, at Hobart Town; and from that port to the Cocos, she would sail in what we may call the great zone of little variation* and then again, like the homeward bound East Indiamen, increase her variation to the Cape, having it, for a time, at right angles with her keel. She then approaches very closely to the magnetic Node in the Atlantic as she proceeds to Rio, and from that port sails back, mostly at about right angles to the magnetic meridian, to the Cape de Verds; then upon it to the Azores,

* At the Magnetic Equator in the Eastern Hemisphere there is a zone of at least 100° of Longitude in which the variation only ranges from 5° West to 5° East.

where her course again lies more or less athwart it to England, like the homeward bound vessels of which we have already spoken.

If we allow any influence at all to terrestrial magnetism, the error of thirty-three seconds which Captain Fitzroy describes does not at all seem excessive or surprizing; nor again, that while amongst our own, or with our own and foreign navigators, many admirable coincidences in Chronometric measurements are to be found, some hitherto unaccountable discrepancies, from which some discussion and ink-shed have arisen, should also exist.

It is clear, I think, that, wholly apart from the ship's local attraction, and all the precautions which science can devise, the agreement or discordance of any two sets of Chronometric measurements, even by the same Chronometers and observers, may depend upon the ship's track; upon the position of the XII. VI. line (or other polar line) of the balances of the Chronometers in relation to the keel; and all this again upon the *degree* of polarization of the balances! Here are surely the elements of a great and delicate scientific investigation yet to be made?*

It would seem then to result from the foregoing facts and views, though writing in Calcutta I have been unable to consult a host of authorities to which I should have been desirous of referring, such as Gauss, Sabine, Duperrey, Blosseville, &c. that temperature is by no means "the principal cause of the variation of the rates of Chronometers" and indeed we have of late years had some extensive experiments made to prove that Chronometers may undergo great variations of temperature without any considerable change of rate, though to these also

* It should be made by a double Chronometric voyage; one ship proceeding East and another West. Both should rate their Chronometers, specially and independently of all other rating, as near as may be to the Magnetic Nodes (say at Bahia and Manila which are about 12h. apart), and while measuring their chain of distances should particularly endeavour to ascertain, at various spots, the effect of the placing of the XII.—VI. or polarized line of the balances coinciding with, or athwart, and at various angles to the Magnetic meridian. Perhaps part of the Spitzbergen variations recorded by Mr. Fisher, (page 62) may have been due also to this cause, and if the Chronometers had been placed in the Magnetic meridian they would have given different results. He evidently overlooks the terrestrial magnetism and attributes the change of rate to the absence of the ship's local attraction only.

I cannot now refer; and it seems not improbable that as a change of terrestrial magnetism *also* took place when the changes of temperature occurred with those ships' Chronometers which have supposed their rates affected by temperature, the effects of the one, as more sensible and better known, or in other words nearer at hand, have been compendiously attributed to the other. The causes seem to stand rather in the following order as to the importance of their effects, the whole of them being constant ones.

I. The ship's local attraction. Sometimes that of the cargo in merchantmen, or of warlike stores in a man-of-war: Alters rates also by *privation*, as when cargo or warlike stores are discharged, or Chronometers carried on shore.*

II. Terrestrial magnetism, and the angle made by the poles of the polarized balance with the magnetic meridian.

III. Changes of temperature.

It is evident also that all these may be under some circumstances trifling, or that one may neutralise the two others if they should act in opposite directions; but it is also evident that they may be each comparatively trifling in itself, yet, if the whole act the same way, they may amount on a long voyage to a considerable error, against which it behoves the careful navigator to be on his guard. The scientific workman will consider, better than I can do, if it may not be worth his while to produce on trial a Chronometer from the balance of which magnetic metals should be wholly excluded. Glass balances have, I know been tried, but found too fragile. Tough porcelain would seem to promise better.

* "The changes so frequently noticed to take place in the rates of Chronometers moved from the shore to the ship *and the reverse*, are well known to be caused partly by change of temperature and partly by change of situation," says Captain Fitzroy, p. 326 of appendix; and in a note: "This may be connected with magnetism." The work is published in 1839, and Mr. Fisher's second paper appeared in 1837, but Captain Fitzroy may not have seen it, since he refers only so cursorily to a fact of such high importance shewn by direct experiment.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL

FOR JANUARY, 1851.

The Annual General Meeting of the Asiatic Society was held on the 8th instant, at the usual hour and place.

The Honorable SIR J. W. COLVILE, President, in the Chair.

The proceedings of the last Meeting were read and confirmed.

The Hon'ble J. C. Erskine, duly proposed and seconded at the December Meeting, was elected an ordinary member.

Read Letters,

1st. From A. Wattenbach, Esq. ..
2nd. From J. B. Mill, Esq.....
3rd. From James Dodd, Esq. ....
} Signifying their wish to withdraw from the Society.

4th. From W. Seton Karr, Esq., forwarding a copy of the Rig Veda Saṅhitá, presented to the Society, by the Honorable Court of Directors.

5th. From Major W. Anderson, offering to give such parts of the Rauza-tul-Safá, and Habib-ul-Saer, as the Society does not possess, in exchange for such as it may have in duplicate. Referred to the Secretary.

6th. From Dr. A. Sprenger, suggesting that the Ketáb-ul-Máárraf, a work by Ibn Qutaybáh, about 600 years old, of which he possesses two good MSS., be printed in the Bibliotheca Indica.

It was resolved—proposed by Mr. Mitchell and seconded by Dr. Roer, that Dr. Sprenger's proposal to print the Ketab-ul-Máárraf in the Bibliotheca Indica, at the expense of the Oriental Fund, be adopted, and Dr. S. be requested to undertake the editing of the work, and to supply a translation.

7th. From B. H. Hodgson, Esq., submitting an additional notice of the Shou or the Tibetan Stag. Ordered to be printed in the Journal.

8th. From Dr. E. Roer, Secretary, Oriental Section, forwarding a translation, by Dr. Ballantyne, of the Sárhitya Darpana, for publication in the Bibliotheca Indica.

Ordered that the recommendation of the Oriental Section be adopted.

9th. From the same, submitting sundry suggestions from the Oriental Section, for the publication of the Puráṇas.

Ordered that the papers be brought forward for consideration at the next Meeting.

10th. From the same, in reply to a reference from the Society regarding a translation of the 'Vichitra Nátak,' by Capt. Siddons.

Ordered that Capt. Siddons' translation be printed in the Journal.

11th. From Dr. A. Campbell, Darjeling, forwarding specimens of a fish from Nepal. Dr. C. continues, "The Lakes of Thibet swarm with this fish, which is caught in immense quantities with the hand during the winter when the Lakes are frozen over; holes are broken in the ice, to which the fish crowd for air, and they are handed out in great numbers. They are gutted and split up at once; the extreme dryness of the air effects the curing, as you see them, in a few days. Salt is not used to preserve them.

"The principal Lakes for this fish are 'Dochen,' 'Ramchoo,' and 'Yamdo Yeuntro,' (for these 'see Turner's Thibet,' and my Routes to Lassa in the Journal of the Society, for 1848.) Dried, as you see them, they are sent in large quantities to all the principal marts, viz., Lassa, Menchoua, Yiangtchi and Digarchi."

A note was read from Dr. Cantor, in which he states that "Dr. McClelland concurs with me in thinking that the fish is a carp, and belongs either to the genus Schizothorax, Heckel, (Fish aus Caschmir, p. 11,) or to Racoma, McClelland, (Calcutta Journal of Natural History, Vol. II. page 576.) The state of the specimens will not admit of an examination sufficient to identify the species. To take a drawing of the fish is consequently also impracticable."

Mr. Blyth was of opinion that it is a Barbel of the European type, and nearly affined to *Barbus plebeius*, Valenciennes, but remarkable for wanting the barbules on the upper lip from which the genus takes

its name, and that it could be seen that the absence of these barbules was not the result of accident.

He moreover was decidedly of opinion that the species was undescribed in Dr. Heckel's work.

12th. From C. Beke, Esq., presenting a copy of an Enquiry, by him, into M. Antoinie Abbaddies' Journey into Kaffa.

Mr. Mitchell remarked that the resolution moved by Mr. Welby Jackson and seconded by the President, was not appended along with the other extracts from the proceedings of the General Meeting, held on the 6th November, 1850, to the proposed Draft Code, and put various questions touching the omission of that resolution. The President replied; and there appearing grounds to suppose, that the Mofussil members were not sufficiently informed as to the manner in which they were to vote upon the proposed rules, Mr. Mitchell proposed and the President seconded, that the following letter should be forwarded to all the Mofussil Subscribers for their votes, and that the Special General Meeting to consider the draft Code of Bye-Laws be postponed from the 15th of January to the 12th of March, 1851.

SIR,—I beg to inform you that the meeting for the consideration of the proposed Code of Bye-Laws, has been postponed until Wednesday, the 12th of March. This postponement has been made in consequence of an accidental omission to supply you with the requisite information, as to the mode in which the votes of the Mofussil Members on the Proposed Code of Bye-Laws are to be taken.

That information is supplied by the subjoined resolution.

Resolved, that Mofussil Members be requested to vote YES *or* NO *to each rule. Further, that should a Mofussil member make any suggestion of amendment, the Secretary will bring it to the notice of the Meeting, and in the event of any member present supporting the suggestion, it can be disposed of as any other motion; if not so supported, the suggestion will not be considered by the Meeting.*

You are therefore requested to send to me in writing, on or before the 12th of March, your votes upon the Bye-Laws according to the above resolution, (that is) either stating that you vote for the adoption or rejection of the proposed Code as a whole; or writing Yes or No to each rule, and adding by way of proposal any amendment which you may wish to have moved upon any particular rule.

I remain, Sir,

Your Obedient Servant,

Secretary Asiatic Society.

13th. The Council submitted the following report on the affairs of the Society.

Annual Report.

The Council of the Asiatic Society submit with much satisfaction their Annual Report, shewing the state of the Society's affairs during the past year.

At the close of the year 1849, the number of Members was 144, since which period ten (10) new Members have been elected and admitted, and fourteen (14) have returned from Europe, making a total of 24 Members added to the Society during the past year. On the other hand, the Society have to regret the death of four (4) Members, and the loss of (15) fifteen by withdrawal, and that of seven (7) others by departure to Europe. Thus at the close of 1850, the number of Members, actually in India, and subscribing, amounts to 142.

The Council cannot quit this subject without regretting that, whilst in the year 1847-48, there was a steady increase in the list of members, and that the number of elections amounted to 48 and 32, respectively, in the year 1850, there have been only (10) ten elections, and amongst them the name of no native gentleman appears. The Council feel assured that the support of the learned and of the scientific will not be withheld from an institution which for a period of (67) sixty-seven years has steadily carried out the designs of its illustrious founder, and has greatly advanced the cause of science and Oriental literature, and deservedly enjoys the high reputation which all Europe has thankfully and cheerfully accorded.

Finances.

The Council submit the following report from the Finance Committee, which they believe to present a correct and not unsatisfactory statement of the financial position and prospects of the Society.

Asiatic Society's Rooms, January 3, 1851.

The Members of the Finance Committee, having carefully examined the annual accounts of the Asiatic Society for the year 1850, are happy that they are able to submit an encouraging report on its Financial position.

From a minute investigation into the Government grants, the income of the Asiatic Society from all sources, and of its expenditure, the Committee are happy to find that the annual surplus, taking into con-

sideration the present number of subscribers in India and the existing rate of subscriptions, may fairly be estimated to amount to (3,000) three thousand Rupees. The pressing debts of the Society amount to Rs. 4,880, but of Rupees 1,615, which is considered to be in suspense and not hopeless, at least Rs. 1,200 may be considered sooner or later available to meet the liabilities of the Society, which would thus be reduced to Rupees 3,680; leaving, however, a surplus of present assets (over the chances of any such ultimate recoveries of sums in the least doubtful, entirely out of consideration and) over every description of debt, which may safely be reckoned to amount to three thousand rupees.*

The Society has, moreover, paid off during the past year the sum of Rupees 4,447-8-3 as the annexed detail shows.

(Signed) J. R. Colvin.
S. G. T. Heatly.

* Income.

(From the Society's own resources).

Contribution, ... Rs.	8,253	3	9
Library, ...	41	0	0
Sale of Oriental Works, ...	1,044	6	3
Journal, ...	1,295	8	0
Miscellaneous, ...	100	0	0
Total, ...	10,734	2	0

Expense.

(Not provided by the Government Grants).

Zoological Department, ... Rs.	864	0	0
Library, ...	1,764	4	6
Sale of Oriental Works, ...	32	13	6
Journal, ...	3,000	0	0
Secretary's Office, ...	636	15	9
Building, ...	100	0	0
Miscellaneous, ...	1,337	1	2
Total, ...	7,735	3	0
Income, ... Rs.	10,734	2	0
Expense, ...	7,735	3	0
Surplus Rs.	2,998	15	0

Rules of the Society.

The Council of the Asiatic Society, in their last Annual Report, drew the attention of the Society to the necessity of revising the existing rules; the Society having resolved that such a revision should be made, a revised code of Rules has been submitted to the Society, and will be taken into consideration on the 15th instant.

Secretaries.

About the commencement of the past year, the Society was deprived of the valuable services of Mr. Laidlay, who was compelled by ill-health to re-visit Europe. Mr. Laidlay's ability, zeal and worth are too well known to require any lengthened eulogium at the hands of the Council. In consequence of a resolution of the Society Mr. Laidlay, though absent, continues to be one of the Joint-Secretaries of the Society.

About the same time, the exigencies of the public service rendered it imperative on Dr. O'Shaughnessy to resign the appointment of Secretary, which he had so long, so ably, and so zealously filled. The Council, with the sanction of a general meeting of the Society, conveyed to that gentleman the expression of their deep regret at his resignation of the office of Secretary, and unanimously resolved to place on record their grateful sense of his valuable services. At a meeting of the Society held on the 1st May, 1850, Captain Hayes was elected Secretary in the room of Dr. O'Shaughnessy.

Journal.

The number of Journals which have been published with the past year amount to 9, including three for October, November and December, 1849, which comprise the valuable and interesting catalogue of Malayan Fishes by that eminent naturalist, Dr. Cantor. This number in materials, in fact, equals (6) six ordinary ones, and will supply certain important desiderata in the Icthyology of the Eastern Seas long felt and anxiously expected.

Bibliotheca Indica.

During the past year (8) eight numbers have been issued. A sub-committee consisting of J. R. Colvin, Esq. W. Jackson, Esq. Captain Broome, Babu Ram Gopal Ghose, and Captain Hayes, have been appointed to report upon the publication and suggest whatever they might deem advisable with reference to it. Owing

to circumstances, the Sub-Committee has not been yet able to submit a report.

Museum.

Curators have been very regular in their attendance to their studies. The arrangement of the skeletons in the Museum of Natural History reflects much credit on Mr. Blyth. In July last, the Society called upon Mr. Piddington to submit a report on the Museum of Economic Geology, which has accordingly been submitted by the Curator.

Library.

About 130 volumes have been added to the Library in the year 1850; during which period the Society has expended the sum of Rupees eighty-nine, thirteen annas and six pie (Rs. 89-13-6) in the purchase of books.

The state of the Library demands the anxious attention of the Council, in order that the numerous works in science and literature which are much required may be procured, and the value of the Library with reference to standard works enhanced, and as there appears some prospect of a permanent surplus, the Council beg to recommend, that the improvement of the Library should be considered the primary object to which such surplus, if any, should be devoted.

Librarian.

The Librarian has been very attentive and unremitting in the discharge of his duties, and the Council would desire to mark their sense of that official's conduct and application.

The interest which is evinced in the Museum and in the Society at large is manifest by the vast number of Europeans, Americans and Natives who visit the institution.

By order of the Council,

January the 8th, 1851. Signed F. Hayes, *Secretary.*

After the conclusion of the proceedings, the President retired, and Mr. S. G. T. Heatly, Member of the Council present, took the chair, and the meeting then proceeded to the election of Office-Bearers and Members of the Council and of the several Sections.

On scrutiny of the lists it being found that three gentlemen for the Council had received the same number of votes each, the Chairman gave his casting vote in favor of Mr. Grote, and the following gentlemen were declared elected.

President.—Sir James Colvile, Kt.

Vice-Presidents.

The Lord Bishop.
W. Jackson, Esq.
J. W. Laidlay, Esq.
W. B. O'Shaughnessy, Esq.

Council.

J. R. Colvin, Esq.
C. Beadon, Esq.
W. Seton Karr, Esq.
A. Grote, Esq.
J. Newmarch, Esq.
Ramgopal Ghose, Esq.
R. W. G. Frith, Esq.
Capt. A. Broome,
S. G. T. Heatly, Esq.

Secretary.—Capt. F. C. C. Hayes.

ORIENTAL SECTION.

W. Jackson, Esq.
Bábu Harimohan Sen.
Rev. W. Kay.
Dr. E. Roer.
W. Seton Karr, Esq.
Bábu Rajendralál Mittra.
Rev. J. Long.

SECTION OF NATURAL HISTORY.

A. Mitchell, Esq.
R. W. G. Frith, Esq.
A. Grote, Esq.

STATISTICAL SECTION.

Dr. D. Stewart.
A. Mitchell, Esq.
C. Beadon, Esq.
Rev. J. Long.
W. Macintosh, Esq.

SECTION OF GEOLOGY AND MINERALOGY.

A. Mitchell, Esq.
Capt. Broome.

PHYSICS AND METEOROLOGY.

Capt. Thuillier.
J. Newmarch, Esq.
Venerable J. H. Pratt.
Col. Forbes.

FINANCE COMMITTEE.

J. R. Colvin, Esq.
S. G. T. Heatly, Esq.
C. Beadon, Esq.

Dr. *Abstract Statement of Receipts and*

RECEIPTS.

To Museum.

Received from the General Treasury the amount of allowance authorized by the Court of Directors for the service of a Curator from December 1849 to November, 1850, at 250 Rs. per mensem, ... Rs.	3,000	0	0			
Ditto ditto for the preparation of Specimens of Natural History from ditto to ditto, at 50 Rs. ditto, ...	600	0	0			
Ditto back amount of Mr. Swarris's salaries, his services not having been entertained, as per cash book,	30	0	0			
				3,630	0	0

To Museum of Economic Geology.

Received from ditto the amount of allowance authorized by Government for the service of a joint Curator from December 1849 to November, 1850, at 250 Rs. per mensem, ...	3,000	0	0			
Ditto ditto for Establishment and contingencies, at 64 Rs. per mensem,.....	768	0	0			
Ditto amount of fines from Carpenter's pay, ...	1	5	3			
				3,769	5	3

Carried over,.....	7399	5	3

Disbursements of the Asiatic Society, for the year 1850. Cr.

DISBURSEMENTS.

By Museum.

Paid Mr. E. Blyth's salary as Curator from December 1849 to November, 1850, being 12 months, at 250 Rs. per mensem,				3,000	0	0
Ditto ditto house-rent from ditto to ditto, being 12 months, at 40 Rs. per mensem,				480	0	0
Ditto Establishment of Taxidermists, Artists, &c., from December 1849 to August, 1850, at 82 Rs. per ditto, ..	738	0	0			
Ditto ditto from September to November, 1850, at 62 Rs. per ditto,	186	0	0			
				924	0	0
Ditto for Contingencies incurred for the preparation of Specimens of Natural History,				332	15	0
Ditto Rucket Carpenter for Sundry Works,				21	13	6
Ditto for one gross of Teak Wood small forms including paper at 8 as. per dozen,				6	0	0
Ditto for 8 dozen glass stoppered bottles,				28	2	6
					4,792	15 0

By Museum of Economic Geology.

Ditto Mr. H. Piddington's salary Joint-Curator from December 1849 to November, 1850, being 12 months at 250 Rs. per mensem,				3,000	0	0
Ditto Establishment from December 1849 to November, 1850,				420	0	0
Ditto for Contingencies,				89	11	3
Ditto for 4 lbs. liquor ammonia,				17	0	0
Ditto for 8 vols. Berzelius' Traité de Chimie,				56	0	0
Ditto for a copy of Bengal Directory for the year 1849,				8	0	0
Ditto for a copy of Becquerel's Elements de Physique Terrestre,				10	0	0
Ditto for a copy of Dana's Mineralogy,				5	0	0
Ditto for a copy of Austen's Elementary Course of Geology,				9	0	0
Ditto for a copy of Tailor's Statistics of Coal,				18	12	0
Ditto for Sundry Books,				31	0	0
Ditto for 7 Maps,				12	0	0
Ditto for 5 Test Glasses,				5	0	0
Ditto for 2 dozen of Glasses, Cups,				6	0	0
Ditto for ½ lb. Carbonate Ammonia,				2	0	0
					3,689	7 3

By Museum of Mineralogy and Geology.

Paid Mr. H. Piddington, Curator for Sundry Contingencies,				28	13	3
					28	13 3
Carried over,					8511	3 6

			Brought forward,.....	7399	5 3
To Library.					
Received by sale of Miscellaneous Books, ...	41	0 0			
				41	0 0

To Sale of Oriental Publications.

Received by sale of Oriental Works sold at the Library and subscriptions to the "Bibliotheca Indica,"..	1,044	6 3			
				1,044	6 3
			Carried over,.....	8484	11 6

Brought forward,.....					8,511	3 6
By Library,						
Paid Babu Rajendra lal Mittra's salary as Assistant Secretary and Librarian from December 1849 to November, 1850, being 12 months, at 70 Rs. per mensem,.....			840	0 0		
Ditto Establishment from December 1849 to November, 1850, being ditto, at 37-8 per mensem, ...			450	0 0		
Ditto Contingencies from December 1849 to October, 1850, ...			42	5 3		
Ditto Messrs. W. Thacker and Co. for purchase of Books, ...			61	12 0		
Ditto Messrs. L. C. Lepage and Co. for purchase of books and landing charges, ...			15	12 0		
Ditto Duftery for binding books, ...			310	8 0		
Ditto Messrs. Stewart, Ford and Co. account current Messrs. Smith Elder and Co. for parts 2nd, 3rd, of Richardson's Ichthyology for H. M. Ship Sulphur, at,.....10 s.	£ 1	0 0				
Carriage overland to Calcutta, ...	0	3 0				
	£ 1	3 0				
Exch. at 1 *s.* 10½ *d.* per rupee is Co.'s Rs.....			12	5 3		
Paid Mr. C. Martin, for Sundry Stationery, ...			14	2 0		
Ditto E. C. Plum, Comr. Brig. "Erin" freight for 2 Cases,.....			6	0 0		
Ditto charges for landing parcels, ...			11	8 0		
					1,764	4 6
By Sale of Oriental Publications.						
Paid Mr. M. G. Castello, Govt. Steam Department, freight for two parcels despatched to Capt. M. Kittoe, Benares, ...	3	0 0				
Ditto ditto freight ditto to ditto,.....	5	7 6				
			8	7 6		
Ditto Hurrischunder Bose and Sons, freight on a case of books despatched to Messrs. W. H. Allen and Co. London,.....	16	0 0				
Ditto charges for shipping ditto on Board the Ship,.....	1	4 0				
			17	4 0		
Ditto Messrs. Smith and Cowel, freight on a case of books despatched to Rev. J. Wilson and Dadabhoy Punduring, Esq. at Bombay, ...	5	0 0				
			5	0 0		
Ditto Mr. M. G. Castello, Govt. Steam Department, freight for Sundry Oriental Works, despatched to Rev. W. Smith, Benares, on account current J. Muir, ...	1	8 0				
Packing charges, ...	0	10 0				
	2	2 0				
			2	2 0		
					32	13 6
Carried over,.....					10,308	5 6

				Brought forward,.....	8,484	11 6
To Journal.						
Received by sale of the Society's Journal and Subscriptions to ditto, ...			1,295	8 0	1,295	8 0
To Secretary's Office.						
Received from Buckawoolla Peon, in full of Rs. 10 advanced him on account of his salary, ...			7	0 0	7	0 0
To Contributions and Admission Fees.						
Received from Members amount of quarterly Contributions from Jan. to Dec. 1850,.....	7,710	1 11				
Ditto in advance, ...	63	1 10				
Ditto ditto by transfer,.....	208	0 0				
			7,981	3 9		
Ditto ditto Admission Fees,.....			272	0 0		
					8,253	3 9
To Miscellaneous.						
Received from R. H. Buckland amount proceeds of old Furniture sold at their Auction on account of the Society,.....			35	12 3	35	12 3
				Carried over,.....	18,076	3 6

Brought forward,.....					10,308	5 6
By Journal.						
Paid Rev. J. Thomas, on account current Baptist Mission Press, for printing the Society's Journal from October 1848 to August, 1849.			3,388	0 0		
Ditto Mr. Thomas Black, Proprietor of the Asiatic Lithographic Press, for Lithographing plates, &c.....			441	15 9		
Ditto Ramgopaul Roy, Engraver for making and engraving six copper plates of Indian Coins, ...			96	0 0		
Ditto Mudoosoodun Doss, Draftsman, his salary from March to October last,.....			99	2 3		
Ditto Horeemohun Doss, for coloring 100 copies plates of Fishes, ...			4	0 0		
Ditto Mr. G. H. Stapleton, for lithographing 400 copies of 2 Diagrams, ...			4	0 0		
Ditto colouring 409 copies of plates of Fishes, ...			16	5 9		
Ditto Abdul Halim Draftsman for drawing on transfer paper, a chart of the Jumna's Cyclones, ...	10	0 0				
Ditto ditto for copy of a map of Spiti Valley, ...	22	0 0				
			32	0 0		
Ditto freight for Journals despatched to Messrs. W. H. Allen and Co. London, ...			78	6 0		
Ditto contigencies and postages, ...			40	2 3		
					4,200	0 0
By Secretary's Office.						
Paid Establishment from December 1849 to November, 1850, at 42 Rs. per mensem, ...			501	7 6		
Ditto Extra Duftery for ruling papers, from December 1849 to 8th May, 1850, ...			5	4 3		
Ditto Stationery, ...			27	14 0		
Ditto extra writer, ...			4	10 9		
Ditto engraving and making a seal,.....			3	0 0		
Ditto Messrs. W. Thacker and Co. for Stationery, ..			8	0 0		
Ditto Messrs. D'Rozario and Co. for ditto, ...			3	8 0		
Ditto for a Writing Table, ...			13	12 0		
Ditto for Account Books,.....			3	7 0		
Ditto for Contingencies and Postages,.....			66	0 3		
					636	15 9
By Miscellaneous.						
Paid Mr. Halligan's salary, as night guard from December 1849 to November, 1850, being 12 months, at 40 Rs. per mensem,.....			480	0 0		
Ditto for Advertizing Meeting of the Society in the Newspapers, ...			96	5 6		
Ditto Mr. J. Chaunce, for winding up and keeping the clock in order from May 1849 to April, 1850,...			25	0 0		
Ditto Rev. J. Thomas, account current Baptist Mission Press, for printing Miscellaneous Papers, &c.			450	12 0		
Ditto Bábu Dukenarunjun Mookerjee, Collector of Assesment for the premises of the Asiatic Society, Park Street, No. 45, from May to September, 1850,			105	0 0		
Carried over,.....					15,145	5 3

Brought forward,.....				18,076 3 6

To BALANCE.

As per account closed on the 31st of December, 1849,	614	14	7	
Amount in the Bank of Bengal account of Journal Asiatic Society as per separate account closed on the 31st December, 1849, ...	108	12	4	
				723 10 11
Carried over,.....				18,799 14 5

			Brought forward,.....		15,145	5 3
Ditto for Sundry Contingent charges for the Meeting, and oil for night guard, ...				81 9 6		
Ditto Essurchunder Doss, for packing boxes,.....				11 10 3		
Ditto for an Iron Chest, ...	46	4	0			
Ditto for making stand, &c. for ditto,..	8	0	0			
				54 4 0		
Ditto Sibchunder Doss, extra writer for copying revised rules of the Society, ...				4 0 0		
Ditto Babu Rajendra Lall Mittra Librarian, Postage for despatching draft code of rules to Mofussil Members, ...				20 8 0		
Ditto for Sundries, ...				3 0 0		
Ditto for lithographing 256 copies of bills, at 2 Rs. per 100,.....				5 0 0		
					1,337	1 3
By Building.						
Paid J. M. Vos, Esq. in full of his account for repairing the premises of the Asiatic Society as per bill,..				380 10 3		
Ditto Mr. R. Crow, builder for masonry work done to the premises of ditto, ...				81 6 6		
					462	0 9
By H. Torrens, Esq.						
Paid him by transfer in part payment of Rs. 934, due to him by the Society on the 31st December, 1849,				64 0 0		
					64	0 0
By J. Muir.						
Paid him by transfer in part payment of Rs. 268, due to him by the Society on the 31st December, 1849,				64 0 0		
					64	0 0
By J. W. Laidlay.						
Paid him by transfer in part payment of Rs. 459-7-4, due to him by the Society on the 31st December, 1849,.....				16 0 0		
					16	0 0
					17,088	7 3
By Balance.						
In the Bank of Bengal, ...	1,279	9	8			
Ditto on account of the Journal, ...	108	12	4			
Cash in hand, ...	19	2	8			
A draft on the Accountant General, ..	160	0	0			
				1,567 8 8		
			Carried over,	1,567 8 8	17,088	7 3

Brought forward,.....	18,799	14	5
Company's Rupees.	18,799	14	5

				Brought forward,	1,567	8	8	17,088 7 3
By Inefficient Balance.								
For balance of the amount advanced to Mr. Templeton, for Contingences in the Museum and Zoology Department, for May and June, 1849, ...				7	1	0		
For balance of the amount advanced to Mr. E. Blyth, for ditto ditto for November last, ...	50	1	0					
Ditto ditto for December,..	50	0	0					
				100	1	0		
Ditto Babu Rajendra Lall Mittra Librarian, for ditto for October and November,.....	20	12	6					
Ditto for December, ...	16	0	0					
				36	12	6		
							143 14 6	
								1,711 7 2
Company's Rupees.								18,799 14 5

Errors and Omissions Excepted,

Collychurn Nundy.

Dr. *The Oriental Publication Fund in*

January 11th, 1850.—To Cash paid Dr. E. Roer, Editor of the Oriental Journal—Bibliotheca Indica, his Salary for December last,.....	100	0	0			
Ditto ditto, Establishment for ditto,.....	70	0	0			
Ditto ditto, Contingencies for ditto,.....	4	13	6			
Ditto 16th ditto, Establishment for the Custody of Oriental works for December, 1849, ...	42	0	0			
				216	13	6
February 4th, ditto, Dr. E. Roer, Editor of the Oriental Journal—Bibliotheca Indica, his Salary for January,.....	100	0	0			
Ditto ditto, Establishment for ditto, ...	70	0	0			
Ditto ditto, Contingencies for ditto, ...	5	8	0			
Ditto 16th ditto, Establishment for the Custody of Oriental Works for January,.....	42	0	0			
Ditto 6th ditto, Sariett Ullah Duftery for binding Sundry Oriental Works as per bill, ...	13	12	0			
Ditto 13th ditto, Babu Rajendralal Mittra for Sundry Contingencies for December, 1849,.....	2	4	0			
Ditto 20th ditto, for January, ...	1	5	0			
				234	13	0
March 4th ditto, Dr. E. Roer, Editor of the Oriental Journal—Bibliotheca Indica, his Salary for February, ...	100	0	0			
Ditto ditto, Establishment for ditto, ...	70	0	0			
Ditto ditto, Contingent for ditto, ...	4	12	0			
Ditto 12th, ditto, Babu Rajendralal Mittra for Sundry Contingencies for February last, ...	0	12	0			
Ditto 21st ditto, Establishment for the Custody of Oriental Works for February, ...	42	0	0			
				217	8	0
April 1st, 1850.—To Cash paid Rev. J. Thomas, on account of Baptist Mission Press, for printing Bib. Indica for October and November, 1849. Nos. 22 and 23,.....	546	0	0			
Ditto 6th ditto, Sariett Ullah Duftery for binding books as per bill, ...	11	6	0			
Ditto 1st ditto, Dr. E. Roer, Editor Oriental Journal—Biblio. Indica, his Salary for March, ...	100	0	0			
Ditto ditto, Establishment for ditto, ...	70	0	0			
Ditto ditto, Contingencies for ditto,.....	4	6	0			
Ditto 23d ditto, Babu Hurrakissen Dhur, manager Asiatic Library for a copy of Lexicon Bibliographicum, Vol. I.	10	0	0			
Ditto 24th ditto, Establishment for the Custody of Oriental Works for March, ...	42	0	0			
Ditto ditto, Babu Rajendralal Mittra for Sundry Contingencies for March, ...	1	1	0			
Ditto ditto, Mannulal for a MS. copy of Dara Sekh's Persian translation of the Upanishads,.....	12	0	0			
				796	13	0
Carried over,.....				1,465	15	6

Account Current with the Asiatic Society. Cr.

January 1st, 1850.—By Balance of account closed and published down to the 31st December, 1849.								
Company's Papers of the new 5 per Cent. Loan deposited with the Govt. Agent,	4,000	0	0					
Cash in the Bank of Bengal,	580	8	3					
Cash in hand,	14	14	0					
				4,595	6	3		
							4,595	6	3
Ditto 22d ditto.—By Cash received from the General Treasury, being the monthly grant sanctioned by the Court of Directors for the month of December, 1849,				500	0	0		
							500	0	0
February 23rd, ditto ditto for January, 1850,				500	0	0		
							500	0	0
March 21st, ditto ditto for February, 1850,				500	0	0		
							500	0	0
April 21st, 1850.—By Cash received from the General Treasury, being the amount of monthly grant sanctioned by the Hon'ble Court of Directors for the month of March, 1850,				500	0	0		
							500	0	0
May 21st, ditto ditto for April, 1850,				500	0	0		
							500	0	0
June 21st, ditto ditto for May, 1850,				500	0	0		
							500	0	0
July 16th, ditto ditto for June, 1850,				500	0	0		
							500	0	0
August 19th, 1850.—By Cash received from the General Treasury, being the Amount of monthly grant sanctioned by the Court of Directors for the month of July, 1850,				500	0	0		
							500	0	0
Ditto ditto.—Amount invested in the new 5 per Cent. Government Loan as per sub-Treasurer's receipt countersigned by the Government Agent,				1,500	0	0		
							1,500	0	0
September 21st, ditto Amount received from the General Treasury, being the monthly grant sanctioned by the Court of Directors for the month of August, 1850,				500	0	0		
							500	0	0
October 5th, ditto ditto for September, 1850,				500	0	0		
							500	0	0
November 19th, ditto ditto for October, 1850,				500	0	0		
							500	0	0
December 21st, 1850.—By Cash received from the General Treasury, being the monthly grant sanctioned by the Court of Directors for the month of November, 1850,				500	0	0		
							500	0	0
Carried over,							12,095	6	3

				Brought forward,.....	1,465	15 6
May 18th ditto, Dr. E. Roer, Editor of the Oriental Journal—Bibliotheca Indica, his Salary for April last,.....	100	0	0			
Ditto ditto, Establishment for ditto, ...	70	0	0			
Ditto ditto, Contingencies for ditto,.....	5	13	6			
Ditto ditto, Establishment for the Custody of Oriental Works for April, ...	42	0	0			
Ditto ditto, Babu Rajendralal Mittra for Sundry Contingencies for April last,.....	1	6	0			
					219	3 6
June 25th ditto, Sariet Ullah Duftery for binding books, as per bill, ...	22	0	0			
Ditto ditto, Establishment for the Custody of Oriental Works for May last,.....	42	0	0			
					64	0 0
July 22nd ditto, Establishment for the Custody of Oriental Works for June last, ...	42	0	0			
Ditto 25th ditto, Babu Rajendralal Mittra for Sundry Contingencies for May and June last, ...	2	9	0			
					44	9 0
August 14th, 1850.—To Cash paid Establishment for the Custody of Oriental Works for July last, ...	42	0	0			
Ditto 19th ditto, J. S. Patton, Government Agent as contribution for a new 5 per Cent. Government Loan, ...	1,500	0	0			
Ditto 24th ditto, Dr. E. Roer, Editor of the Oriental Journal—Bibliotheca Indica, his Salary for May, June and July last, ...	300	0	0			
Ditto ditto, Establishment for ditto, ...	210	0	0			
Ditto ditto, Contingencies for ditto, ...	20	10	6			
Ditto 28th ditto, Madanmohan Sarmana for Sundry Oriental Works, viz. 5 Copies Kádambari, Vol. 2. 1 ditto Dasha Kumára. 1 ditto Sánkhya Tattva Kaumudí. 1 ditto Byákarana Bhusansár, as per bill.	14	0	0			
					2,086	10 6
September 16th ditto, Establishment for the Custody of Oriental Works for August last, ...	42	0	0			
Ditto ditto, Babu Rajendralal Mittra for Sundry Contingencies, July last, ...	3	12	0			
Ditto 21st ditto, Dr. E. Roer, Editor of the Oriental Journal—Bibliotheca Indica, his Salary for August last,.....	100	0	0			
Ditto ditto, Establishment for ditto, ...	45	0	0			
Ditto ditto, Contingencies for ditto, ...	28	6	0			
					219	2 0
October 29th ditto, Establishment for the Custody of Oriental Works for September last,.....	42	0	0			
Ditto 30th ditto, Rev. J. Thomas, for printing the Bibliotheca Indica for December, 1849, and from January to April, 1850, or Nos. 24 to 28, as per bill,.....	1,252	10	0			
					1,294	10 0
				Carried over,.....	5,394	2 6

Brought forward,..... 12,095 6 3

Carried over,..... 12,095 6 3

o 2

				Brought forward, ...	5,394	2 6
November 16th ditto, Establishment for the Custody of Oriental Works for October last.....	42	0	0			
Ditto ditto, Dr. E. Roer, Editor of the Oriental Journal—Bibliotheca Indica, his Salary for September and October last,.....	200	0	0			
Ditto ditto Establishment for the months of September and October, ...	78	0	0			
Ditto ditto, Contingencies for ditto, ...	56	11	0			
Ditto 21st ditto, Babu Rajendralal Mittra for Sundry Contingencies for September last,.....	2	5	6			
Ditto 25th ditto, Sariet Ullah Duftery for binding sundry books, as per bill, ...	22	8	0			
Ditto 29th ditto ditto, for binding sundry books, as per bill, ...	6	12	0			
					408	4 6
December 18th, 1850.—To Cash paid Dr. E. Roer, Editor of Oriental Journal—Bibliotheca Indica, his Salary for November last,.....	100	0	0			
Ditto ditto, Establishment for ditto, ...	35	0	0			
Ditto ditto, Contingencies for ditto, ...	29	5	0			
Ditto ditto, Establishment for the Custody of Oriental Works for ditto, ...	42	0	0			
					206	5 0
Dec. 31st, 1850.—To balance Company's Paper of the new 5 per Cent. Loan deposited with the Government Agent, ...	5,500	0	0			
Cash in the Bank of Bengal,.....	554	2	9			
Cash in hand,.....	32	7	6			
					6,086	10 3
				Company's Rupees,....	12,095	6 3

Calcutta, Asiatic Society,
the 31st Dec., 1850.

Brought forward,.....	12,095	6	3

Company's Rupees,....	12,095	6	3

Errors and Omissions Excepted.
CALLYCHURN NUNDY.

Assets.						
Amount of Bills outstanding from Members including those for the 4th Qr. of 1850, Bills realizable, ...	6,031	1	3			
Ditto in suspense,.....	3,797	5	4			
				9,828	6	7
Ditto ditto outstanding on account Journal of the Asiatic Society including those due on the 1st January, 1851,	2,706	0	0			
Ditto ditto outstanding on account Sale of Books in the Library,.....	1,228	0	0			
Ditto ditto outstanding on account Bibliotheca Indica, ...	186	0	0			
Balance in the hands of London Agents Messrs. W. H. Allen and Co. as per their account closed on the 30th June, 1849, £63 11 1 @ 2*s*. P. R., ...	635	8	8			
Ditto due from the Batavian Society of Arts and Sciences for Books purchased and supplied to them,.....	83	1	9			
Ditto due from Mr. Hodgson on account current, ...	33	12	0			
Balance due from Mr. Bennett,..	304	1	4			
				5,176	7	9
Company's Rupees,				15,004	14	4

Liabilities.						
By amount due to the Baptist Mission Press as follows:						
For printing the Society's Journal for September, October, November, and December, 1849, ...	1,246	0	0			
Ditto Nos. I. II. III. IV. V. VI. of 1850,.....	1,194	0	0			
				2,440	0	0
Ditto Miscellaneous papers, Catalogue of the Society's Museum, &c. &c. ..	1,600	8	0			
				1,600	8	0
Ditto due to the Hon'ble Sir J. W. Colvile,.....	690	0	0			
Ditto ditto to Mr. Laidlay,.....	443	7	4			
Ditto ditto to Mr. Torrens,.....	870	0	0			
Ditto ditto to Mr. Muir,.....	159	14	0			
				2,163	5	4
Company's Rupees,..				6,203	13	4

Errors Excepted,
COLLYCHURN NUNDY.
31*st December*, 1850.

N. B. The amount of cost for printing Mr. Blyth's Catalogue of Birds now in press is estimated by Mr. Thomas to be about Company's Rupees, ... 840 0 0

LIST OF MEMBERS

OF THE

ASIATIC SOCIETY OF BENGAL.

Anderson, Major W.
Avdall, J. Esq.
Abbott, Major James.
Barlow, Sir R. Bart.
Beaufort, F. L. Esq.
Birch, Lieut.-Col. R. J. H.
Blagrave, Capt. T. C.
Bogle, Major A.
Bowring, L. R. Esq.
Broome, Capt. A.
Buckland, C. T. Esq.
Batten, J. H. Esq.
Brodie, Capt. Thos. 5th N. I.
Beckwith, J. Esq.
Bell, Dr. Adam.
Blundell, G. Esq.
Banks, Capt. J. S.
Beadon, C. Esq.
Bruce, Lieut. R. C. D. 29th N. I.
Byng, The Hon'ble Capt. R. B. P.
Burton, Capt. C. E.
Boyes, Capt. W. J. E.
Bayley, H. V. Esq.
Cheap, G. C. Esq.
Colvin, J. R. Esq.
Colvin, B. J. Esq.
Corbyn, F. Esq.
Colvile, The Hon'ble Sir J. W.
Campbell, A. Esq.
Currie, E. Esq.
Cunningham, Capt. J. D.
Colebrooke, E. Esq.
Cautley, Col. P. T.
Davidson, T. R. Esq.
Dirom, W. M. Esq.
Douglas, Capt. C.
Dwárikánátha Dása Basu, Bábu.
Dalton, Lieut. Ed. 9th N. I.
Durand, Major H. M.
Earle, W. Esq.
Elliot, W. Esq. (M. C. S.)
Edgeworth, M. P. Esq.
Elliot, Sir H. M.
Elliot, J. B. Esq.
Frith, R. W. G. Esq.
French, Gilson R. Esq.
Falconer, Dr. H.
Forbes, Lieut.-Col. W. N.
Fytche, Capt. A.
Frith, W. H. L. Esq.
Greenway, Wm. Esq.
Gubbins, C. Esq.
Govinda Chandra Sen, Bábu.
Grote, Arthur, Esq.
Grey, J. J. Esq.
Hodgson, B. H. Esq.
Hopkinson, H. Esq.
Houston, R. Esq.
Huffnagle, C. Esq. M. D.
Harimohana Sen, Bábu.
Hannygton, Major J. C.
Hall, F. E. Esq.
Hamilton, R. N. C. Esq.
Hay, A. Esq.
Hearsay, Lieut.-Col. J. B.
Heatly, S. G. T. Esq.
Hayes, Capt. Fletcher.
Jackson, W. B. Esq.
Jenkins, Lieut.-Col. F.
Jones, R. Esq.
Jackson, L. S. Esq.
Jerdon, T. C. Esq.
Kay, Rev. W.
Kittoe, Capt. M.
Keane, Rev. W.
Latter, Lieut. T.

Loch, G. Esq.
Lackersteen, Count J.
Logan, J. R. Esq.
Lamb, Dr. G.
Lawrence, Sir H. M.,
Lushington, H. Esq.
Lushington, E. H. Esq.
McLeod, D. F. Esq.
Muir, J. Esq.
Mitchell, A. Esq.
Money, D. J. Esq.
Mackintosh, Wm. Esq.
Maclagan, Lieut. R.
Money, W. J. H. Esq,
Morton, Dr. D. T.
Maxwell, Lieut. H.
Marshman, J. C. Esq.
Martin, Dr. Wm.
Mills, A. J. M. Esq.
Newmarch, J. H. Esq.
Ommaney, M. C. Esq.
O'Shaughnessy, W. B. Esq. M. D.
Peel, The Hon'ble Sir Lawrence.
Phayre, Capt. A. P.
Prinsep, C. R. Esq.
Prasannakumára Tagore, Bábu.
Pratt, The Venerable Arch-deacon J. H.
Packenham, Capt. G. D.
Pratáb Chandra Sing, Rájá.
Ramánátha Tagore, Bábu.
Rámagopála Ghosa, Bábu.
Ripley, Lieut. F. W.
Rogers, Capt. T. E.
Ráma Chánd Sing, Rájá.
Rámaprasáda Ráya, Bábu.
Rowe, Dr. J.
Rájendra Datta, Bábu.
Reddie, J. Esq.
Seton Karr, W. Esq.
Sleeman, Lieut.-Col. W. H.
Sherwill, Lieut. W. S.
Spilsbury, G. G. Esq.
Stewart, Dr. D.
Samuells, E. A. Esq.
Satyacharana Ghosál, Rájá.
Strong, F. P. Esq.
Sandes, F. C. Esq.
Shaw, J. T. Esq.
Smith, Rev. W. O'Brien.
Stephen, Capt. J. G. 8th B. N. I.
Thomason, The Hon'ble J.
Torrens, H. Esq.
Trever, C. B. Esq.
Thuillier, Lieut. H. E. L.
Thomas, R. Esq.
Thurburn, R. V. Esq.
Walker, H. Esq.
Willis, J. Esq.
Wilson, The Right Rev. Daniel, Lord Bishop of Calcutta.
Waugh, Lieut.-Col. A. S.
Watkins, C. T. Esq.
Young, Dr. R.

List of Members elected during the year 1850.

Byng, The Hon'ble Capt. R.
Grey, J. J. Esq.
Jackson, L. S. Esq.
Kay, Rev. W.
Marshman, J. C. Esq.
Morton, Dr. D. T.
Mills, A. J. M. Esq.
Reddie, J. Esq.
Smith, Rev. W.
Watkins, C. T. Esq.

Loss of Members during the year 1850.

By departure to Europe.

Grant, J. W. Esq.
Johnstone, John, Esq.
James, Lieut. H. C.
Laidlay, J. W. Esq.
Low, Col. H.
Strachey, Lieut. R.

By death.

Henry, Dr. W.
Ouseley, Lieut.-Col. J. R.
Scott, J. S. B. Esq.

By withdrawal.

Austen, Lieut. Albert G.
Alexander, Henry R. Esq.
Bazeley, Capt. F. R.
Bushby, G. A. Esq.
Briggs, Lieut. D.
Champneys, Capt. E. G. S.
Hannay, Major F. S.
Udny, G. Esq.
Low, Col. J. H.
McClelland, J. Esq.
Macrae, Dr. A. C.
Staples, Lieut. N. A.
Slater, Rev. S.
Stubbs, Lieut. F. W.

Report of Curator, Zoological Department, for the months of October, November and December, 1849.

Sir,—I have the honour to report the following acquisitions in the Zoological Department of the Society's Museum; the first six referring to specimens which I personally make over to the Society.

1. Received from C. T. Eyton, Esq. Skins of three species of Chilian *Rodentia*, viz. *Octodon degus*, *Spalacopus Poëppigii*, and *Cavia australis*. Also skeletons of *Scolopax rusticola* and of *Podiceps cristatus*; and numerous bird-skins, comprising the following species new to the museum. *Psittacula passerina*, *Ieracidea berigora*, *Leuconerpes dominicanus*, *Eudynamys taitensis*, *Saurothera vetula*, *Diplopterus guira*, *Ægotheles novæ hollandiæ*, *Podager nacunda (?)*, *Petrophanes Temminckii*, *Eulampis jugularis*, and some other *Trochilidæ*, *Strepera arguta*, *Donacobius atricapillus*, *Cichlaris guianensis*, *Grauculus canus*, *Platysteira melanoptera*, *Todirostrum melanocephalum*, *Petroica bicolor*, *Prosthemadera novæ zeelandiæ*, *Odontophorus dentatus*, *Lobipes hyperboreus*, and *Dendrocygna arborea*, with some other species already in the museum.

2. Collected by Lt. Abbott, of the 18th Royal Irish Regiment. A large and very fine collection of shells from V. D. Land and Torres' Straits, also a skin of *Dasyurus maculatus*, and a very fine example of *Botaurus melanotus*, both from V. D. Land. Specimens of an *Auricula* from the Sunderbuns; and the young of *Arachnothera magna* from Darjiling.

3. Collected at Muscat, by Captain Hodges of the 'Almohammady.' A collection of fishes mostly in excellent condition; and another large jar containing examples of most of the species brought to the fish-bazar at Muscat, was unfortunately broken during rough weather, and the specimens destroyed. Among those brought is a fine *Acanthurus* (wholly black, with bright yellow caudal fin), which is not described in the *Hist. des Poissons*,—a large *Ostracion* of the *Lactophrys* division, and specimens of *Heniochus macrolepidotus*, *Thynnus pelamys*, *Amphicanthus sutor*, *Scarus psittacus*, Rüppell, *Belone annulata*, and others undetermined. Captain Hodges also collected a few sea-shells and sundries; and brought a spoiled specimen of a Frigate-bird from the Indian Ocean, which corresponds with *Attagen ariel*, Gould.

4. Another good collection of fishes in spirit was brought by Mr. Moxon of the Pilot Service from Malacca. Among them are some not included in Dr. Cantor's lately published Catalogue of Malayan fishes, and I recognise an undoubted specimen of *Caranx xanthurus*, Kuhl and V. Hasselt, and a *Cæsio* affined to *C. erythrogaster*, ibid.; also *Psettus rhombeus* and other genera new to the Society's collection. Mr. Moxon also brought some

Holothuriæ, Crabs (a *Lupa* and a *Grapsus*), a *Draco volans*, and a *Coluber*; also a particularly fine specimen of *Helix unicincta*, Fer., and faded examples of *Cyclostoma semisulcatum*, Sow., and other land-shells, all from Malacca; and finally he has permitted me to select several interesting skins of mammalia, and of birds an adult *Pontoëetus humilis*, and chick and male of the first year of the Argus Pheasant. Among the mammalia is a skin of *Sciurus laticaudatus*, Muller, one of three in the collection; and one of a Squirrel affined to, but not wholly resembling, *Sc. modestus*, Muller, and which is not included in Dr. Cantor's catalogue of mammalia inhabiting the Malayan peninsula.

5. From Sr. Lustra, of the Spanish Frigate 'La Ferrolana.' A few marine Philippine shells, comprising beautiful examples of *Cypræa geographica*.

6. From Babu Rajendra Mullika. Several carcases of animals, including a fine Gazelle (*E. cora, var.* ?)., a young buck *Bara Singha* Deer, and other specimens.

7. From Mr. Robinson, Inspector of Govt. Schools, Asám. A few shells sent for determination, among which are fragments of the curious Helicine genus *Megaspira*, a *Unio* which seems peculiar, and examples of *Melania terebra*.

8. From Capt. Banks, of the ship 'Owen Potter.' The skin of a remarkably fine adult specimen of *Diomedea exulans*.

9. From Mr. Piddington. A snake *(Bungarus cæruleus)* which was killed in the hold of the ship Hyderee, a Bombay vessel, which has been in this port, however, upwards of a year.

10. From Mr. Kelaart, of the Ceylon Medical Service. Two collections of Cinghalese mammalia and birds from the mountainous or Kandyan country, upon which I am preparing a separate and more elaborate report. Several new species are sent, and the mass of these collections is to be returned; but Mr. Kelaart has presented some specimens to the Society, among which are *Sciurus trilineatus*, Waterhouse (new to Ceylon), *Palæornis Calthrapæ*, *Spizaëtus nipalensis* (from Newera Ellia, and not hitherto observed in S. India), and both sexes of a *Caprimulgus* affined to *C. indicus* but smaller, of which Mr. Jerdon formerly sent a specimen from the Nilgiris (vide *J. A. S.* XIV, 208, note).

11. From Mr. J. Baker, Noacolly. A specimen (injured) of *Ketupa ceylonensis*.

12. I further present to the museum two examples of a new species of *Garrulax*, sent to me alive from Charra Punji by Mr. Frith; and specimens of *Platycercus Baueri* and *Cairina moschata*.

I also beg to call attention to some of the skeletons which have been

recently mounted, as the large female cetal noticed in p. 426; that of a female Gaour; and the Giraffe skeleton will also be soon added.

I am, Sir,

Your Obedient Servant,

As. Soc. Rooms, Jan. 3rd, 1851. E. BLYTH.

To the Secretary of the Asiatic Society.

LIBRARY.

The following books have been added to the Library since the last meeting.

PRESENTED.

The Rig-veda Saṅhitá with the Commentary of Mádhaváchárya. Edited by Dr. Max. Muller. London 1850. 4to.—PRESENTED BY THE HON'BLE COURT OF DIRECTORS OF THE EAST INDIA COMPANY.

Observations made at the Magnetical and Meteorological Observatory at Hobart Town in Van Diemen Island, and by the Antartic Naval Expedition. Printed by order of Her Majesty's Government under the Superintendence of Lieut.-Col. E. Sabine. Vol. I. Commencing with 1841. With abstracts of the observations from 1841 to 1848, inclusive. London 1850. 4to.—BY THE SAME.

The Natural Productions of Burmah, or Notes on the Fauna, Flora, and Minerals of the Tenaserim Provinces and the Burman Empire. By Rev. Francis Mason, A. M. Moulmein 1850, 12mo.—BY THE AUTHOR.

Journal of the Academy of Natural Sciences of Philadelphia, Vol. I. @ VIII. (Vol. VI. part 1, wanting). 8vo.—BY THE ACADEMY.

Ditto ditto New Series, 4to. Vol. I. 4 parts.—BY THE SAME.

Proceedings of the Academy of Natural Sciences of Philadelphia. Vols. I. @ III. and the first 5 Nos. of Vol. IV.—BY THE SAME.

Notice of the Academy of Natural Sciences of Philadelphia with an Appendix. Phil. 1836, Pamphlet. 8vo.—BY THE SAME.

A Memoir of William Maclure, Esq. By Dr. S. G. Morton, Phil. 1841. 8vo. Pamphlet.—BY THE SAME.

Additional Observations on a new Living Species of Hippopotamus, of Western Africa, (Hippopotamus siberiensis). By Samuel George Morton, M. D. Philadelphia 1849, fol. (Pamphlet).—BY THE AUTHOR.

Monograph of the Fossil Squalidæ of the United States. By Robert W. Gibbes, M. D. Philadelphia 1848, fol. (Pamphlet).—BY THE AUTHOR.

Catalogue of Skulls of Man and the Inferior Animals in the collection of Dr. S. G. Morton. Third Edition. Phil. 1849. 8vo. Pamphlet.—BY DR. S. G. MORTON.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the month of November, 1850.—BY THE DEPUTY SURVEYOR GENERAL.

Christiya Panjiká for 1851. Bengali, Calcutta, 1851. 8vo.—By the Rev. J. Long.

Lectures to Educated Native Young Men. Lecture 4th, by the Rev. K. M. Bannerjea, on Vedantism.—By the Rev. J. Long.

The Oriental Baptist, for January, 1851.—By the Publisher.

The Oriental Christian Spectator, for November 1850.—By the Editor.

The Calcutta Christian Observer, for January, 1851.—By the Publisher.

Upadeshaka, for January 1851.—By the Publisher.

Satyárnaba, No. 7.—By the Rev. J. Long.

Journal of the Indian Archipelago, for November, 1850.—By the Editor.

Ditto ditto, 2 copies.—By the Government of Bengal.

Tattvabodhiní Patriká, No. 89.—By the Tattvabodhiní Sabhá.

The Sailor's Horn Book for the Law of Storms: being a practical exposition of the theory of the Law of Storms. By H. Piddington, Esq. Second Edition. London 1851. 8vo.—By the Author.

The Citizen, for December, 1850.—By the Editor.

Exchanged.

The Athenæum, Nos. 1200-1-2-3.

Purchased.

The Annals and Magazine of Natural History, Nos. 3, 4, 5.

The Edinburgh Review, No. 188.

The North British Review, No. 190.

Comptes Rendus, Nos. 9 @ 16.

Journal des Savants, for August and September, 1850.

Reichenbach's Researches on Magnetism.

Harrison on Languages.

Knox's History of Man.

Bengal Army List, for January, 1851.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of January, 1851.

Date.	Observations made at Sun-rise.						Observations made at apparent noon.						Maximum Pressure observed at 9h. 50m.					
	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.
	Inches	°	°	°			Inches	°	°	°			Inches	°	°	°		
1	30.015	59.4	60.0	58.4	Calm	Clear	30.054	67.8	71.3	66.4	N.	Cirro-strati	29.994	73.5	75.5	67.3	N.	Cumuli
2	29.980	63.4	63.0	62.3	Ditto	Ditto	.023	69.8	72.0	68.0	S. W.	Clear	.979	75.2	76.5	70.0	S.	Ditto
3	30.038	64.4	63.8	62.5	N.	Cloudy	.102	66.2	66.2	63.4	N. N. W.	Cumuli	30.066	70.3	71.2	64.8	W.	Ditto
4	.082	59.2	58.2	58.0	Calm	Foggy	.151	62.5	64.7	61.0	N.	Clear	.101	69.0	70.3	62.2	N.	Ditto
5S	.077	59.4	59.3	58.0	N.	Clear	.118	64.7	66.0	61.6	N.	Ditto	.051	69.0	69.7	62.4	N.	Ditto
6	.001	59.9	59.0	58.0	N.	Ditto	.074	64.3	66.2	61.3	N.	Ditto	.014	69.6	70.6	62.6	N. W.	Cumulo-strati
7	.052	59.2	59.2	57.4	N.	Ditto	.108	65.3	67.0	62.0	N.	Ditto	.064	71.2	72.8	63.6	N. W.	Cumuli
8	.062	58.4	58.4	57.0	Calm	Ditto	.133	66.3	69.4	63.8	N. W.	Ditto	.077	72.0	73.3	63.6	N. W.	Clear
9	.064	59.0	59.0	58.0	Ditto	Ditto	.128	66.6	69.4	63.8	N. E.	Ditto	.075	73.6	76.5	66.3	N.	Ditto
10	.031	61.7	61.5	60.6	N. E.	Ditto	.123	68.6	71.0	64.4	N. E.	Ditto	.068	74.3	76.6	67.2	N. E.	Ditto
11	.053	61.2	61.4	60.0	N.	Ditto	.123	68.6	70.8	64.6	N.	Ditto	.068	73.2	75.0	65.2	N.	Ditto
12S	.046	61.8	62.2	61.0	N.	Ditto	.101	68.6	70.6	65.3	N.	Ditto	.044	73.3	75.2	65.6	N.	Ditto
13	.001	63.0	62.5	61.6	N.	Cirro-strati	.061	69.2	71.3	66.3	N. E.	Cumuli	.013	75.2	77.2	67.7	E.	Cirro-strati
14	.058	66.4	66.4	65.3	N.	Cloudy	.118	69.8	71.2	68.7	N. E.	Ditto	.070	74.7	75.4	70.9	N. W.	Cumulo-strati
15	.045	64.6	64.0	62.8	N.	Cumuli	.134	68.0	68.9	65.6	N.	Clear	.094	72.4	74.2	67.8	N. W.	Cumuli
16	.076	61.2	60.6	58.3	N.	Clear	.176	66.3	68.0	60.7	N. sharp	Ditto	.141	70.4	70.9	60.3	N. sharp	Clear
17	.100	59.2	58.8	56.3	N.	Ditto	.167	65.4	67.0	58.6	N.	Ditto	.116	70.8	73.0	61.4	N. N. W.	Ditto
18	.078	58.4	57.8	54.5	N.	Cirro-strati	.160	64.7	66.4	58.3	N.	Cirro-strati	.107	69.7	70.8	59.8	N.	Cirro-strati
19S	.047	58.2	57.9	55.3	Calm	Clear	.118	67.2	70.2	61.0	N.	Clear	.073	72.6	74.3	62.6	N.	Clear
20	.031	60.0	60.2	58.3	N.	Ditto	.088	67.8	70.4	63.3	N.	Ditto	.042	74.0	76.6	65.3	N.	Ditto
21	.070	61.5	61.6	59.8	N.	Cirro-strati	.131	69.7	72.3	65.8	N.	Cirro-strati	.091	75.0	77.0	67.4	N.	Cirro-strati
22	.122	65.2	64.4	61.7	N.	Ditto	.182	68.5	69.3	60.9	N. W.	Clear	.136	72.5	74.0	63.4	N. W.	Clear
23	.146	59.6	59.0	55.3	N.	Ditto	.210	64.2	64.8	56.0	N.	Ditto	.145	69.0	69.6	58.0	N. W.	Ditto
24	.119	56.9	56.0	53.7	N.	Clear	.168	62.6	63.9	58.0	N. W.	Ditto	.106	67.8	69.0	60.2	N. W.	Ditto
25	.045	56.4	56.5	55.4	N.	Foggy	.124	64.0	65.4	60.6	N.	Ditto	.074	69.5	70.6	60.8	N.	Ditto
26S	.065	57.8	57.9	56.4	N.	Cirro-strati	.123	65.5	68.2	61.4	N. W.	Cirro-strati	.077	70.6	72.2	62.6	N. W.	Cirro-strati
27	.046	60.5	61.2	60.0	Calm	Foggy	.112	65.9	68.9	66.2	N.	Clear	.050	73.0	74.5	67.3	S. W.	Cumuli
28	.041	61.2	61.0	60.0	Ditto	Ditto	.090	67.0	70.5	66.6	S.	Cumuli	.032	73.8	76.0	68.2	S. W.	Cirro-strati
29	.011	63.0	62.8	62.2	N.	Cirro-strati	.061	69.0	71.0	64.5	N.	Cirro-strati	.019	73.0	75.0	66.5	N.	Ditto
30	29.991	64.0	63.7	63.4	N.	Foggy	.051	66.3	68.0	66.2	S. W.	Clear	.009	73.3	76.2	67.4	S. W.	Clear
31	30.001	62.5	62.5	61.3	N.	Cirro-strati	.094	69.0	71.3	67.0	N.	Cirro-strati	.046	73.5	75.5	67.2	N. W.	Cirro-strati
Mean	30.051	60.9	60.6	59.1	....	.....	30.116	66.8	68.8	63.3	....	.....	30.067	72.1	73.7	64.7	....	.....

[*Meteorological Register, continued.*]

Observations made at 2hs. 40m.						Minimum Pressure observed at 4 p. m.						Observations made at sun-set.						Maximum and Minimum Thermometer.				Rain Gauges.			
Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Max.	Mean.	Min.	Max. Therm. in sun's rays.	Feet. Upper.	Feet. Lower.	Moon's Phases	Date.
Inches	°	°	°			Inches	°	°	°			Inches	°	°	°			°	°	°	°	Inch.	Inch.		
29.938	77.0	77.8	68.3	N.	Cumuli	29.920	76.5	76.3	68.0	N.	Cumuli	29.924	74.7	74.0	67.9	N.	Clear	78.3	69.2	60.0	97.7	..	00.7		1
.913	78.3	79.0	70.3	S.	Cumulo-strati	.902	77.7	77.3	68.2	S.	Cumulo-strati	.900	75.0	74.0	68.4	S.	Cirro-strati	79.3	71.5	63.6	93.8	..	..		2
30.000	73.4	74.0	64.3	N.	Cumuli	.999	73.0	72.5	63.0	N.	Clear	.992	71.0	70.3	63.8	N.	Clear	74.6	69.6	64 5	90.8	..	..	●	3
.035	72.7	73.5	64.3	N.	Ditto	30 022	72.4	72.0	63 3	N.	Cumuli	30.034	70 8	69.8	63.3	N.	Cirro-strati	73.7	65.9	58.0	89.7	..	..		4
29.971	73.0	72.8	62.4	N.	Ditto	29.967	72.0	71.4	62.0	N. W	Ditto	29.973	70.2	69.0	62 4	N. W.	Clear	73.7	66.7	59.7	87.0	..	..		5
.957	73.0	73.3	62.7	N.	Ditto	.963	72.3	72.0	62 0	N. W.	Cirro-strati	.974	70.8	69.8	62.0	N. W.	Cirro-strati	73.7	66.4	59.0	88 0	..	..		6
.995	75.0	75.3	64.6	N.	Clear	.990	74.0	73.3	63.8	W.	Clear	.987	72.3	71.3	63.3	N.	Clear	75.7	67.4	59.0	93.0	..	..		7
30.013	75.8	76.4	64.7	N.	Ditto	.995	75.2	74.8	63.8	N. W.	Ditto	.989	73.0	71.4	64.0	N.	Ditto	76.9	67.7	58.5	93.5	..	..		8
29.991	78.0	79.2	67.3	S.	Ditto	.983	77.8	77.6	66.2	S.	Ditto	.977	75.8	74.4	66.2	S. W.	Ditto	79.5	69.3	59.0	98.0	..	..		9
.995	78.0	78.7	67.4	N. E.	Ditto	.981	77.6	77.0	66.6	N.	Ditto	.993	75.0	74.0	61.2	N.	Ditto	79.4	70.5	61.5	96.6	..	..	☽	10
.999	77 5	78.2	67.2	N. W.	Ditto	.993	77.4	77.0	67.0	N.	Ditto	30.007	75.0	74.0	66.7	N.	Ditto	79.0	70.3	61.5	94.4	..	..		11
.962	78.4	80.2	66.8	N.	Ditto	.952	78.4	78.2	67.0	N.	Ditto	29.967	76 0	75.0	67.6	N.	Ditto	79.8	71.0	62.2	100 6	..	..		12
.952	79.3	80 3	69.0	N. E.	Cirro-strati	.949	78.7	78.4	69.6	S. E.	Cirro-strati	.964	76.3	75.6	69.0	S. E.	Cloudy	80.8	71.8	62.7	99.0	..	..		13
.982	76.4	77.7	71.6	N. W.	Cumuli	.978	76.4	75.9	70.8	N. W.	Cumuli	.982	74.2	73 0	69.7	N. W.	Ditto	78.5	72.3	66.0	94.2	..	..		14
30.020	76.4	76.4	68.0	NNW	Ditto	30.013	75.2	74.3	66.9	NNW	Ditto	30.032	73.4	72.7	66.3	N.	Clear	77.3	70.8	64.3	93 2	..	..		15
.054	73.4	73.5	62 2	NNW	Clear	.027	72.9	71.9	61.0	N.	Clear	.031	70.7	69.3	60.4	N.	Ditto	74.3	67.6	60.8	90.8	..	..		16
.047	74.3	74.8	62.5	W.	Ditto	.032	73.8	73.0	61.4	N. W.	Ditto	.042	70.5	70.3	61.8	N.	Ditto	75.5	67.3	59.0	91 6	..	..		17
.033	74.3	75.0	61 2	W.	Cirro-strati	.017	74.4	73.9	60.8	NNW	Ditto	.025	72.2	70.8	60.9	N.	Ditto	75.7	66.9	58.0	90 4	..	..	⊙	18
.001	76.2	76.9	63.6	N.	Clear	29.987	76.0	75.3	63.0	N.	Ditto	29.995	73.3	72 3	64.3	N.	Ditto	77.6	67.9	58.2	93.0	..	..		19
29.978	78.6	79.6	67.3	N.	Ditto	.962	78.5	78.1	66.2	N.	Ditto	.970	75.6	74.3	66.8	N.	Cirro-strati	80.4	70.4	60.4	100.5	..	..		20
30.022	79.3	79 9	67.7	N.	Cirro-strati	30.014	79.3	79.0	67.5	N.	Cirro-strati	30.024	76.5	75.3	67.4	N.	Clear	80.8	71.4	61.9	94.0	..	..		21
.063	76.3	77.2	66.5	N. W.	Clear	.052	76.6	76.0	65.9	N.	Clear	.058	74.0	72.9	65.0	N.	Ditto	78.2	71.5	64.8	94.0	..	..		22
.065	72.2	72.5	60.0	W.	Ditto	.045	72.2	71.1	59.3	w.n.w.	Ditto	.059	69.7	68.0	59.3	N. W.	Ditto	73.0	66.0	59.0	88.3	..	..		23
.021	71.5	71 3	60.2	w.n.w.	Ditto	.012	71.7	71.4	60.2	w.n.w.	Ditto	.022	69.5	68.5	60.8	N. W.	Ditto	72.9	64.7	56.5	86.2	..	..	☾	24
29.993	73.0	73.3	61.4	N. W.	Cirro-strati	29.991	73.0	72.7	61.2	N. W.	Cirro-strati	.007	71.3	69.5	62.0	N.	Cirro-strati	74.4	65.6	56.7	86.7	..	..		25
.983	75.0	75.2	61.8	N. W.	Ditto	.977	74.9	74.3	61.3	N. W.	Ditto	29.983	72.2	70.7	62.6	N.	Ditto	76.2	67.0	57.8	92.8	..	..		26
.979	77.4	78.3	66.3	S. W.	Clear	.933	77.3	76.7	65.0	S. W.	Clear	.973	74.8	73.7	65.8	N.	Clear	78.6	69.5	60.4	95.4	..	..		27
.955	78.3	79.2	66.8	S.	Cirro-strati	.947	78.0	78.0	63.6	S. W.	Cirro-strati	.955	75.2	74.0	65.2	S. W.	Cirro-strati	79.6	70.3	61.0	96.0	..	..		28
.937	78.3	78.2	66.8	N.	Ditto	.933	78.0	77.8	66.3	N.	Ditto	.932	75.4	75.0	67.4	N.	Ditto	79.3	71.4	63.5	95.7	..	..		29
.945	78.2	79.0	68.0	W.	Ditto	.941	79.0	78.7	66.5	N. W.	Ditto	.951	75.8	74.6	67.6	N. W.	Ditto	79.8	72.1	64.3	97.7	..	..		30
.974	78.3	80.0	68.5	N.	Ditto	.976	79.4	79.6	67.7	N.	Ditto	.980	76.8	76.0	67.5	N.	Ditto	80.6	72.0	63.3	98.8	..	..		31
29.993	76.0	76.7	65.5	....	.....	29.983	75.8	75.3	64.7	....	.....	29.990	73.5	72.4	64.7	....	.....	77.3	69.1	60.8	93.6	..	00.7		

CODE OF BYE-LAWS

FOR THE

ASIATIC SOCIETY

OF

BENGAL.

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BYE-LAWS.

TITLE AND OBJECT.

Name and object.

1. The Institution shall be denominated as heretofore, the Asiatic Society of Bengal, and in the words of its Founder "the bounds of its investigations will be the Geographical limits of Asia, and within these limits its enquiries will be extended to whatever is performed by man or produced by nature."

CONSTITUTION.

Designation of Members.

2. The Society shall consist of Ordinary Members, Corresponding Members, Honorary Members, and Associates.

Ordinary and Corresponding.

3. The number of Ordinary and Corresponding Members shall be unlimited.

Honorary and Associates.

4. The number of Honorary Members shall be prospectively limited to thirty, that of Associates to fifteen; and *until* the number of Honorary Members is reduced to thirty, the Society shall not elect more than one new Member annually.

All nations eligible.

5. Persons of all nations shall be eligible as Members of the Society.

MEMBERS.

ORDINARY MEMBERS.

Ordinary Members, Election of.

6. Every Candidate for admission as an Ordinary Member shall address to the Secretary a letter stating, that he is anxious to promote the progress of science and literature, and is desirous of becoming a Member of the Society. He must also be proposed by one and seconded by another Ordinary Member. The letter shall be laid before the next meeting of the Council, and the names of the Candidate and his proposer and seconder, shall be read at the two ordinary general meetings next ensuing such meeting of the Council, and during the interval between these two meetings shall be suspended in the Society's meeting room, and the person proposed shall be balloted for at the last of such ordinary general meetings; and to constitute a valid election not less than eleven Members must be present, and not less than two-thirds of those present must vote in favour of the Candidate proposed.

Notice of Election.

7. Persons so elected shall receive immediate notice of their election from the Secretary together with a copy of the Rules.

Payments.

8. Ordinary Members shall pay an admission fee of Rs. 32 and a quarterly payment of Rs. 16 in advance, commencing from the quarter in which they are elected, so long as they are resident in India. These rates to be continued for two years and to be then subject to revision.

On return to India.

9. All Members on their return to India shall be called upon to pay their subscription as usual from the date of their return.

10. It shall be optional for any Member to compound for the quarterly contributions by the payment of 500 Rupees. **Composition in lieu of subscriptions.**

11. All sums so paid shall be invested in Company's Paper, and kept as a reserve fund, the interest of which alone shall be appropriated to the current expenses of the Society. **Fund arising from composition.**

12. The payment of the admission fee shall be considered as distinctly implying the acquiescence of every Member elected into the Society in all Bye-Laws, Rules, and Regulations thereof. **Acquiescence, in the Rules.**

13. When any Member shall be in arrear of his quarterly contribution for one year, he shall be apprised by letter addressed to his last known place of residence, that unless the amount due by him be paid before the end of the current year, his name will be removed from the list of Members; and in the event of his omitting to pay the amount within the time limited, his name shall be removed accordingly, and its removal notified in the proceedings of the Society. **Arrears of subscription.**

14. Members who are 12 months in arrear of their subscriptions, shall not be allowed to vote. **Penalty, if 12 months in arrear.**

15. No Member shall be entitled to vote until he has paid his admission fee. **Vote after payment of admission fee.**

16. The Ordinary Members of the Society shall be entitled to the following rights and privileges. **Privileges of.**

To be present and vote at all general meetings.

To propose Candidates for admission into the Society.

To introduce visitors at the ordinary general meetings.

To have personal access to the Museum, Library, and other public rooms of the Society and there to examine

the specimens, printed books, plates, drawings, and MSS. belonging to the Society. They shall also have the privilege of taking out books, plates, drawings, and MSS. from the Library and specimens from the Museum, subject to such Rules and Regulations as the Council shall enforce agreeably to Rule 78.

To receive gratis copies of the numbers of the Journal and Researches of the Society, published during the time they continue to be Members.

To purchase other numbers of the Journal and Researches, or any other publications of the Society at reduced prices.

Withdrawal of.

17. Any Member may withdraw from the Society by signifying his wish to do so by letter addressed to the Secretary, provided always that such Member shall be liable to the subscription of the quarter wherein he signifies his wish to withdraw, and that he shall continue liable to the quarterly contribution, until he shall have discharged all sums, if any, due from him to the Society, and shall have returned all books or other property, if any, borrowed by him of the Society, or shall have made full compensation for the same if lost or not forthcoming.

Re-admission of.

18. A Member who has resigned shall be at liberty to withdraw his letter of resignation on payment of arrears, without going through the form of re-election; provided such notice of withdrawal be given during the year in which the resignation has been notified.

No fee on re-admission.

19. A Member who has retired from the Society shall be exempted from the payment of a second admission fee on re-election.

Removal of.

20. If any Member of the Society shall disobey the Rules or Orders of the Society or Council, or shall

commit a breach of order at any of the general meetings, he shall be liable to be removed from the Society. Whenever there shall appear cause for the removal of a Member from the Society, the subject shall be laid before the Council; and if a majority of the Council shall, after due deliberation, determine by ballot to propose to the Society the removal of the said Member, the President shall at any ordinary general meeting of the Society, announce from the chair such determination of the Council; and at the meeting next after that at which the said announcement has been made, the proposition shall be balloted for; and if 11 or more Members shall ballot, and two-thirds of the members balloting shall vote for the removal of such Member, he shall be removed from the Society.

CORRESPONDING MEMBERS.

Corresponding Members.

21. The Corresponding Members of the Society shall consist of such persons not ordinarily resident in Calcutta, or within 20 miles thereof, as are likely to promote the objects of the Society.

Election of.

22. Corresponding Members shall be proposed by the Council, they shall be elected by ballot in the same manner as Ordinary Members.

Privileges of.

23. Corresponding Members when visiting the Presidency shall have the privilege of attending the meetings of the Society, but shall not be entitled to vote. They shall have such personal access to the Library and Museum, and such liberty of there examining their contents as is enjoyed by Ordinary Members.

Removal of.

24. Corresponding Members may be removed in the manner prescribed for the removal of Ordinary Members.

HONORARY MEMBERS.

Honorary Members.

25. Honorary Members shall be persons eminent for their knowledge of, or encouragement given to, science or literature: or for services rendered to the Society.

Election of.

26. When the number of Honorary Members shall not be full, the Council shall have power to recommend a Candidate (stating his claims to such distinction), who shall be balloted for like Ordinary Members, but three-fourths of the votes shall be required to determine his election.

Privileges of.

27. Honorary Members shall be exempt from the payment of fees and contributions: they shall be entitled to the following rights and privileges.

To be present at all general meetings.

To have personal access to the Museum, Library, and other public rooms and there to examine the specimens, printed books, plates, drawings, and MSS. belonging to the Society, and to receive gratis copies of the numbers of the Journal and Researches of the Society, published during the time they continue to be Members.

Disqualifications of.

28. Honorary Members shall not be entitled to vote on any question relating to the affairs of the Society, or to fill any office in the Society.

Removal of.

29. Honorary Members may be removed in the manner prescribed for the removal of Ordinary Members.

ASSOCIATE MEMBERS.

Associate Members.

30. Associate Members shall be persons well known for their literary or scientific attainments, but who are not likely to apply to become Ordinary Members.

31. Associate Members shall be proposed by the Council, they shall be balloted for like Ordinary Members, but three-fourths of the votes shall be required to determine their election. **Election of.**

32. The privileges and disqualifications of Associate Members shall be the same as those of Honorary Members. **Privileges and disqualifications of.**

33. Associate Members may be removed in the manner prescribed for the removal of Ordinary Members. **Removal of.**

NON-RESIDENT MEMBERS.

34. When non-resident Members vote on any question, the vote paper shall be transmitted to the Secretary, post paid. **Non-Resident Members.**

35. The Council of the Society may call upon non-resident Members to vote on questions which they deem of importance, and in this case the expense of collecting the votes shall be defrayed by the Society. **May be called on to vote.**

36. The Council may also appeal from the decision of the resident Members to that of the Society at large; in this case also the expense of collecting the votes of non-resident Members shall be defrayed by the Society. **Appeal to by the Council.**

37. If six or more Members sign a requisition calling upon the Council to appeal from the decision of a meeting of resident Members to that of the whole Society, the Council shall comply with the requisition; but the expense of collecting the votes of non-resident Members shall be defrayed by the persons who have signed the requisition, the amount to be refunded by the Society, if the decision appealed against be reversed. **Appeal to by 6 or more Members.**

38. Non-resident Members shall have the privilege of taking out Books from the Library on making a **Book-Privilege of.**

special application to the Council, and signing an obligation to defray the expense of carriage, and to replace any book which may be lost or damaged. The Council shall be empowered to make such restrictions as to rare and valuable books, manuscripts, &c. as they may deem proper in accordance with Rule 78.

MEETINGS.

GENERAL MEETINGS.

General Meetings.

39. No general meeting of Members shall be competent to enter on any business unless 5 or more Members be present.

Chairman of.

40. The President shall be the Chairman at all general meetings; or in case of his absence, one of the Vice-Presidents; or in case of their absence, the senior Member who shall for the time being have all the authority, privilege, and power of the President.

Method of voting.

41. The ordinary methods of voting shall be by shew of hands, but a ballot shall be taken in cases prescribed by the Rules, or when demanded by any Member present. Subject to the provisions for receiving the votes of non-resident Members under sections 34, 35, 36, and 37.

A majority of votes shall decide questions.

42. The decision of the majority of the Members voting at a meeting, shall be considered as the decision of such meeting; and an absolute majority shall suffice, except in cases specially designated by the Rules.

When votes are equal.

43. When the votes on either side shall be equal, except in cases specially designated in the Rules, the Chairman shall have a second or casting vote.

Notices of motion.

44. Notices of motion shall be given on questions submitted to the Society at a general meeting preceding

that on which the subject is to be disposed of, except in matters of current business and routine; and if any question shall arise whether the subject of a particular motion is such matter, the question shall be determined by the Chairman.

Questions of importance, how to be treated.

45. All proposals affecting expenditure, election, appointment, or removal of officers and servants, changes of organization, and generally all questions of importance, shall be first duly notified at a general meeting, then referred to the Council for report, and finally decided (after such report shall have been submitted) at the annual General Meeting, or at a special meeting, convened for the purpose, at which not less than 12 Members must be present. If the proposal be to amend or alter the Rules, three-fourths of the votes taken shall be necessary to carry the proposed amendment or alteration, and the votes of non-resident Members shall be taken on such proposal.

Right of Protest.

46. Any Ordinary Member shall have the right of recording, in general terms, his protest against the decision of the majority upon any question submitted to the Society.

General Meetings of 3 kinds.

47. The General Meetings to be held by the Society, shall be of three kinds, 1. Annual, 2. Ordinary, 3. Special.

ANNUAL GENERAL MEETINGS.

Annual Meetings.

48. The Annual General Meeting shall be held on the 1st Wednesday in January for the election of Council and Officers for the ensuing year, and to receive and hear read the annual report on the Financial and general concerns of the Society, and for the transaction of any other business of which due notice has been given.

No election of Members at.

49. No person shall be proposed or elected a Member of the Society on the day of the annual meeting.

Notice of annual Meeting.

50. Notice of the annual meeting shall be inserted in two or more newspapers one week at least before the day of meeting.

List of new Council, furnished by Members.

51. Every ordinary Member present at such meeting shall be at liberty to furnish to the Chairman presiding, a list of the names of such persons as he may deem eligible to the posts of Members of Council and Office-Bearers.

Council and Office-Bearers.

52. The Council shall consist of 15 ordinary Members of the Society, out of whom shall be appointed, 1 President, 3 Vice-Presidents, and one or more Secretaries, one of whom may be ex-officio Treasurer.

Plurality of Offices forbidden.

53. No person shall hold at the same time more than one of the following offices, viz. President, Vice-President or Secretary.

Balloting Lists prepared by Council.

54. The Council for the time being shall, before the day of election, cause to be prepared a sufficient number of printed balloting lists according to the form in the appendix, which shall contain the names of those persons whom they recommend to be appointed Members of Council and Office-Bearers for the year ensuing, with blank columns in which to place other names.

Scrutineers.

55. The Chairman shall appoint two Scrutineers to examine the lists and report the result to the meeting.

Lists to be rejected.

56. If any list shall contain more than the proper number of names, or if any list should include the name of any person who is not eligible to the Council, such list shall be deemed void and not taken any account of by the Scrutineers.

57. In case there shall be an equal number of votes for the election into the Council, or to any of the respective offices, of two or more persons, the order of preference shall be decided by lot. **Equality of votes.**

58. During the Ballot, the report shall be read, and the meeting may proceed with the other business, if any, which may remain to be transacted. **Reading Report.**

59. If at the time of closing the ballot for the election of the Members of the Council it shall appear that 11 Members have not balloted, the anniversary meeting shall be adjourned to some other day not less than a week nor more than two weeks after such original meeting. Notice of such adjourned meeting shall be given, and the business shall be transacted, in the manner prescribed in the preceding Rules; and the Council and Officers elected at the preceding annual meeting shall continue to conduct the affairs of the Society until their successors are elected. **Adjournment of Meeting.**

60. In the event of a vacancy during the year in the list of Council or Officers of the Society, such vacancy shall be filled up by the Council, subject to the confirmation of the Society at the second monthly meeting after the occurrence of such vacancy. **Vacancies in Council during the year.**

ORDINARY GENERAL MEETINGS.

61. Ordinary general meetings shall be held on the first Wednesday of every month; the Council shall on special occasions have the power of appointing any other day not later than that day se'nnight for the ordinary meeting of the Society of that month. **Ordinary general Meetings.**

62. Persons not belonging to the Society, if introduced by Ordinary Members, may be present at the ordinary general meetings. Their names and the names **Visitors admitted.**

of the Members who introduced them, shall be given to the President for record.

Order of business.

63. At the ordinary general meetings, the order of business shall be as follows :

1. The names of the visitors allowed to be present at the meeting shall be read aloud by the Chairman.

2. The minutes of the last meeting shall be read by one of the Secretaries, and if found to be accurate, and not to involve any contravention of the rules of the Society, shall thereupon be confirmed by the meeting and signed by the Chairman.

3. The presents made to the Society since their last meeting shall be announced and exhibited.

4. Proposals of Candidates for admission into the Society shall be submitted, and ballots taken as before provided.

5. Motions of which notice was given at the last meeting, shall be brought forward and disposed of.

6. Notice of intended motions shall be given for entry in the proceedings of the meeting ; and every such notice of motion shall be suspended in the meeting room until finally disposed of.

7. Reports and communications from the Council shall be submitted for consideration.

8. Papers and communications addressed to the Society shall be read.

Communications addressed to Society, how disposed of.

64. All communications addressed to the Society shall in the first instance be submitted for the consideration of the Council, who shall cause to be drawn up a programme of the business to be transacted at the ordinary general meetings, and no other business shall be brought forward at such meetings, unless it be declared to be urgent by the President of the Society, and that it could not have been previously communicated to the Council.

SPECIAL GENERAL MEETINGS.

Special General Meetings.

65. Special general meetings of the Society shall be held from time to time, as there may be occasion, for the purpose of taking special matters relating to the business of the Society into consideration.

How convened.

66. Special general meetings may be convened by the Council, or on a requisition to that effect to the President, signed at least by 6 Members of the Society, who thereupon will call the same through the Secretary by public advertisement in three of the newspapers of the Presidency.

A month's previous notice.

67. No special meeting shall take place without a month's previous notice being given, unless the case be declared to be urgent by the requisitionists, when the subject shall be referred to the Council who shall decide on the day when the meeting shall take place.

Business of, restricted to Notice given.

68. No other business than that of which notice has been given in the advertisement convening the meeting, shall be entered upon or discussed at such meeting.

No stranger present at.

69. No stranger shall be permitted to be present at a special meeting of the Society.

COUNCIL.

Council to meet once a month.

70. The Council shall meet once at least in every Calendar month throughout the year, on such day as they shall deem expedient, and no meeting shall be competent to enter on or decide any business unless three or more Members are present.

Special Meetings of.

71. The President, or any two Members, may call a special meeting of the Council.

Chairman.

72. The President, or in his absence one of the

Vice-Presidents, or in their absence the Senior Member, shall preside at every meeting of the Council.

Method of Voting.

73. The ordinary method of voting at the Council shall be by shew of hands, but a ballot shall be taken in cases prescribed by any regulation of the Council, or when demanded by any Member present; and the decision of the majority shall be considered the decision of the meeting; in case of equality of votes, the Chairman shall give a second or casting vote.

Voting may be postponed.

74. The voting on any question, except it be one of adjournment, shall on the demand of any Member present, be postponed to the next ensuing meeting, when the question shall be disposed of.

Minutes of Proceedings.

75. Minutes of the proceedings of every meeting of the Council shall be taken during their progress by one of the Secretaries, or, in case of their absence, by some Member present, whom the Chairman shall appoint for the occasion. The minutes shall afterwards be copied fairly in a minute book and read and signed by the Chairman at the next meeting of the Council.

Minutes, Notices, &c. filed.

76. All letters, notices, minutes of Members, and other documents connected with the business of the Society, shall be filed in the order of their dates and preserved.

Government of Society, entrusted to Council.

77. The Government of the Society and the direction, management, and execution of its concerns, shall be entrusted to the Council, subject to no other restrictions than are and may be imposed by the Rules, and to no other interference than may arise from the decisions of the Members assembled in general meetings.

Rules and Orders of Council.

78. The Council may from time to time make such Regulations and issue such orders not inconsistent with

the Bye-Laws, as shall appear to them conducive to the good Government of the Society, and to the proper management of its concerns; and all such Regulations and Orders shall be binding on all the Members, Officers and Servants of the Society, provided that all such Regulations shall be reported for the information of the Society, at the next general meeting, and be subject to its confirmation.

Appointment of Officers, Clerks, &c. by Council.

79. The Council may appoint persons, not Members of the Society, to be salaried Officers, Clerks, or Servants, for carrying on the necessary concerns of the Society; and may define the duties to be performed by them respectively; and may allow to them respectively such salaries, gratuities, and privileges, as to them the Council may seem proper; and may suspend any Officer, Clerk, or Servant from office, whenever there shall seem to them occasion; provided always that such appointment, allowance, or suspension shall be reported to the next general meeting of the Members, to be confirmed or annulled, as may be decided by such meeting.

Sub-Committees of the Council.

80. The Council shall elect from their own body, Sub-committees or Sections of Oriental Literature, Natural History, &c. also Sub-committees of Finance and papers; whose reports on all matters referred to them shall be submitted to the Council.

Council may call in other members to their assistance on Sub-Committees.

81. The Council shall be at liberty to call into their assistance and appoint as Members of the Sub-committees, or Sections, any other Members of the Society, who are competent and well versed in the subjects to be referred to the said Sub-committees.

Duties, &c. of Sub-Committees, defined by Council.

82. The powers, duties, &c. of the Sub-committees shall be defined by the Council.

May elect their own Chairman and Secs.

83. Every Sub-committee or Section may appoint its own Chairman and Secretary.

May be dissolved by the Council.

84. The Council may dissolve such Committees whenever they shall think proper.

Minutes of proceedings of Sub-Committees.

85. Every Sub-committee shall cause minutes to be taken of its proceedings, and shall produce the original minutes, if required, to the Council.

Council may dispose of duplicate Books, &c.

86. The Council may exchange for other property, or otherwise dispose of, any duplicate books, maps, or specimens, belonging to the Society, in such manner as may, in their opinion, best conduce to advance the objects and interests of the Society.

Annual Report, prepared by Council.

87. The Council shall present, and cause to be read to the Annual General Meeting, a report on the general concerns of the Society. The report shall state the income and expenditure, and disbursements, the balance in hand, the debts and assets, and the increase or decrease of the Society during that year; it shall also specify the average monthly income and expenditure, and give an estimate in detail of the probable income and expenditure of the succeeding year. The report shall also set forth the progress of the Library, and of the Museum in its various departments.

Lists of new Council and Office Bearers, submitted by Council.

88. The Council shall submit to the Annual General Meeting, in every year, lists of such persons as they shall consider most fit to be Members of the Council and Officers for the ensuing year.

PRESIDENT.

Duties of the President.

89. The business of the President shall be to preside at all the meetings of the Society, and regulate all the proceedings; and generally to execute or see to the execution of the Rules and Orders of the Society.

Ex-officio Member of all Committees.

90. The President shall be ex-officio Member of all Committees appointed by the Council.

SECRETARIES.

91. It shall be the duty of the Secretaries, **Duties of the Secretaries.**

1. To conduct the Correspondence of the Society and Council; and to sign all letters and papers emanating from the Society.

2. To attend the general meetings of the Members and meetings of the Council; to take minutes of the proceedings of such meeting during their progress, and at the commencement of every such meeting to read aloud the minutes of the previous meeting.

3. At the ordinary meetings of the Members, to announce the presents made to the Society since their last meeting; to read the names of Candidates proposed for admission into the Society, and the original papers communicated to the Society, or the letters addressed to it.

4. To see that all the proceedings, whether of the Society or of the Council, are entered in the minute books before the following meeting shall be holden, and to see that all letters and papers and documents of every kind connected with the business of the Society, are properly filed and preserved.

5. To edit the Journal and Researches of the Society.

6. To exercise a general supervision over the servants and affairs of the Society and to see that the Rules and Orders of the Society and Council are executed.

92. The Secretaries, if more than one, shall by mutual agreement, divide between them the duties above enumerated, and shall communicate to the first meeting of the Council to be holden after the day of the annual election, which of those duties they have each undertaken to perform. **Duties divided between the two Secretaries, if more than one.**

93. The Secretaries shall be ex-officio Members of all Committees appointed by the Council. **Secretaries ex-officio Members of Committees.**

ASSISTANT SECRETARY, LIBRARIAN, AND CURATORS.

Asst. Secy., Librarian and Curators shall not be Members of the Society.

94. The person who shall be chosen to any one or to all of these offices, to which salaries or emoluments are to be annexed, shall either not be an ordinary Member of the Society; or, if a Member, shall cease to be so, upon his election to, and acceptance of, any such office; as no ordinary Member of the Society is, or shall be, capable of holding any place, office, or appointment under the Society, to which any salary, profit, or emolument, is or shall be annexed.*

TREASURER AND THE ACCOUNTS.

Treasurer, his functions.

95. The Secretary as ex-officio Treasurer, shall receive for the use of the Society, all sums of money due or payable to the Society; and shall pay and disburse all sums due from or payable by the Society; and shall keep particular accounts of all such receipts and payments.

Sums above 100 Rupees.

96. Every sum of money payable on account of the Society exceeding 100 Rupees, shall be paid only by order of the Council.

Lodgment of funds, and surplus.

97. The funds of the Society shall be lodged in the Bank of Bengal; all surplus above 1000 Rupees, shall be invested in Company's securities on behalf of the Society, in the name of the Government Agent.

Accounts submitted monthly and annually.

98. The Accounts and Vouchers of the receipts and expenditure of the Society, shall be submitted monthly and annually, to a Finance Sub-Committee of the Council for examination and audit; they shall also be presented at each monthly meeting, and laid on the Library table, for one month, for examination of Members.

* Provided that every such officer shall have personal access to the Library and Museum and liberty to examine the contents thereof and to take Books out of the Library and Specimens out of the Museum subject to such Rules and Regulations as may from time to time be made by the Council in that behalf under Bye-law 78.

99. Separate accounts shall be kept and rendered of the appropriation of the grants received from Government, for the promotion of oriental literature, and in other departments. **Separate account for Government grants.**

BOOKS AND PAPERS OF THE SOCIETY.

100. There shall be kept a book wherein shall be fairly written, all the Rules, Regulations, and Bye-laws made or to be made, concerning the government and regulating of the Society or Council, and also a Register of the Members of the Society, with the dates of their election. **Statute Book.**

101. There shall be kept Journal Books of the Society, and also of the Council, wherein shall be entered all the Resolutions, orders and proceedings of the Society and Council at their respective meetings, to which Journal Books any Ordinary Member may have access, at such times as the Library is open. **Journal Books.**

PUBLICATIONS OF THE SOCIETY.

102. The Journal or other publications of the Society shall be under the Superintendence of the Council. Contributors to the Journal, &c. shall be entitled to twenty-five copies of their papers. **Journal, &c. of the Society.**

LIBRARY.

103. The Library shall be open from 10 A. M. to 4 o'clock P. M. between which hours, the Librarian shall be in attendance every day, Sunday excepted. **Library, hours of attendance at.**

MUSEUM.

104. The museum shall be open to the public daily, except Sundays. Visitors shall record their names in a Book kept for the purpose. **Museum when open.**

105. All Rules, Regulations, and Bye-laws heretofore passed by the Society, and not contained in this Code, are hereby declared to be abrogated. **Abrogation of all Laws not included in this Code.**

(No. 1.)

Balloting List for the Election of the Council.

Asiatic Society of Bengal,

January, 18 .

BALLOTING LIST FOR THE ELECTION OF THE COUNCIL.

Present Council.	Proposed new Council.	

If you wish to substitute any other name, in place of that proposed, erase the printed name in the second column, and write opposite to it in the third, that which you wish to substitute.

(No. 2.)

Balloting List for the Election of Officers.

Asiatic Society of Bengal,
January, 18 .

BALLOTING LIST FOR THE ELECTION OF OFFICERS, OUT OF NEWLY ELECTED COUNCIL.

Present Officers.	Officers proposed.	
President.		
Vice-Presidents.		
Secretaries.		

If you wish to substitute any other name, in place of that proposed, erase the printed name in the second column, and write opposite to it in the third, that which you wish to substitute.

CENTRAL LIBRARY

JOURNAL

OF THE

ASIATIC SOCIETY.

No. II.—1851.

Translation of some uncertain Greek legends on coins of the Indo-Scythian princes of Cabul. By H. Torrens, Esq. *B.A., V.P. and late Secretary, Asiatic Society of Bengal.*

The ardour with which the study of the numismatic treasures of Afghanistan was pursued a few years back by no few members of our Society, was easily accounted for by the extreme historical interest attaching to them. The number of the Greek Bactrian Kings, the evidence of whose existence and regal power was attested by any thing beyond the meagre mention of history, was up to 1824, *eight;* Bayer having first published two coins of Eucratides and Theodotus in 1738, with his *Historia Regni Græcorum Bactriani* at St. Petersburg, and Colonel Tod, having added but twenty-six years ago with his paper in the 1st Vol. Trans. Royal Asiatic Society, the coins of Apollodotus and Menander to those of Euthydemus, Heliocles, Antimachus Theos, and Demetrius, which were all that had been discovered in Bactrian numismatology during the course of near a century. The progress into Afghanistan of the late Sir Alexander Burnes, the discoveries of Messrs. Court, Ventura, and other French officers in Runjeet Singh's Service, and the investigations carried on near Cabul by Mr. Masson, and reported in this journal, opened a wide new field, and by successive rapidly attained discoveries we became acquainted, not only with all the Greek Bactrian Kings, but with the names and nations of their successors in the lands they ruled over. Professor Wilson in 1841,

collected into a single work, his *Ariana Antiqua*, the results of all that had been done in the investigation of this new page in history, and with the publication of this book, the excitement and the interest of the subject seemed to pass away. Large collections of coins were, it is true, formed by officers and even by English ladies, in Afghanistan, and able numismatists such as Cunningham and Stacy continued their labours as usual; but the historical result of the new study seemed in the mind of the public to have been attained, and no one cared to exert himself in an exhausted subject. I have in my possession a letter to me from Sir Alexander Burnes, remarking on the singular apathy as to enquiry evinced by even able men during our occupation of Afghanistan, while,—such was the fatality in the only active correspondents which the Society had beyond the Indus,—Arthur Conolly, Dr. Lord, and Lieut. Pigou of the Engineers, were successively killed in action within no long time one of the other. Events took place shortly afterwards, which diverted attention from the records of the past, in those and the adjacent regions, to the study of an anxious present, and the existence of Ancient Bactria was forgotten.

The time now appears to me to be propitious for the resumption of the study of her history, not simply as regards herself but in her connection with India; and more particularly as respects later dynasties of Barbaric princes, the Indo-Parthians, the Indo-Scythian, and Sassanian monarchs, satraps, or prefects, who held sway, independently, or as tributaries to a greater power, in portions of the dismembered kingdom of the Bactrian Greeks. Provinces, some of which constituted component parts of these principalities, are now the frontier of the British Empire in the east; tranquillity and good government have succeeded the anarchy which so lately dislocated their whole system; amid the arts of peace, the local history of those lands through which successive races of mankind have from the remotest ages of the world poured themselves into the Indian Peninsula, should most certainly be diligently investigated. The study should not simply be encouraged; it should be enjoined, and public measures taken, such as would be adopted by any other European Government placed in India as is that of England, to facilitate and promote enquiry as upon a question of science. It is not enough that from the little we do know something should have been deduced, and systematically put

on record. The next step is to have the deduction critically examined, and tested by local investigation: if it still then hold good, we may either accept it as material for history, or at any rate allow it to pass current pending the appearance of further light. There is a world of work to be done along the simple frontier of Peshawur (v. Court's conjectures on the march of Alexander, Journal Asiatic Society, Bengal, July, 1836), while the whole Punjab is a rich and almost untried field for the antiquarian and numismatologist. The idea must never be entertained that where there is the darkness of apparent mystery, discovery is hopeless.

I make these few remarks, partly in the hope that they may perchance animate some able investigator to exertion, partly as not out of place with reference to the very subject of this brief paper.

It will be in the recollection of some of the readers of the Journal that much interest was excited by the appearance, on certain of the coins of Arian dynasties subsequent to the Greeks, of pure Greek words, and sometimes of Greek barbarized even to unintelligibility, in conjunction with the title of a Parthian or a Scythian prince. The immediate query in the mind of a philologist was, does this indicate the existence of a Græco-Barbaric vernacular language? Aristophanes introduces in "The Birds" a specimen of such a dialect which no doubt, like the Carthaginian of Plautus's slaves, amused a classic audience as much as Pat or Sawny do an English one. The few words the barbarian of Aristophanes utters are chiefly bad Greek, which, if the conclusion be worth any thing based on so small a fact, would lead one to infer that Greek in these dialects was predominant; and that, putting the case we come across an instance of one, the more Greek we can detect in it, the greater the likelihood that it constituted, not a sort of royal, or medal language, but the actual vernacular of the particular people who made use of it. The thoughts involuntarily wander to the mountains of Kafiristan, that mysterious country, the *Opprobrium Geographiæ Anglicæ*, with its peculiar inhabitants, the self-declared descendants of Alexander's soldiers, who speak, say all informants, a peculiar and unintelligible language. This race of men, be they what they may, have certainly taken refuge from the overflowing tide of immigration in inaccessible haunts, where to this hour they exist, rarely, if ever, quitting their own limits. The Parthian, the

Scythian and the Sassanian, the endless tribes whom the Hindoos and Persians term *Saka* and the Greeks Σκύθαι* (v. Wilson, Ar. Ant. C. III. p. 132, 4to ed.) have swept from the more accessible tracts of the lands they each in their turn sojourned in upon their way to India, the language and the race of their predecessors, after a partial adoption of the one, and an imperfect subjection of the other. It remains yet to be seen whether, safely removed from the high-way of nations, the descendants of those who were for a time tinctured with the tastes of the most civilized people of antiquity, may not be found extant, still perhaps retaining traces of the European stock they came of (v. El-

* The loose and general use of the word by the Greeks as applicable indifferently to many nations, explains many doubtful passages in Herodotus, Strabo and other writers, and is nowhere so definitely asserted as in the gossiping chronicle of the Byzantine, Johannes Tzetzes, Chiliad. XIII.

Καὶ τουτο γίνωσκε καλῶς μηδέ σε λανθανέτω,
Ὡς ἀσβασγοὶ καὶ ἀλανοὶ καὶ σάκαι τε κὰι δάκαι,
Οἱ ῥως κὰι σαυρομάται τὲ κὰι οἱ ἰδίως σκύθαι,
Καὶ πᾶν ὁπόσον πρόσοικον ἔθνος πνοαῖς Βορέου
Κοινῶς κατονομάζονται σκύθαι, σκύθων τῇ κλήσει.

Or in English—

And this know well, and let it not be secret from thee,
That Asbasgæ, and Alans, and Sakæ too, and Dakæ,
The Rhos, and Sauromatæ also and the Scythians proper,
And every whatso nation dwelling near the blasts of Boreas,
Generally are called Scythian, by the name of Scythians.

The Dakæ are the Dadikæ of Herodotus (III. 91) the Daæ (*Ta hi a.* Remusat, Nouvelles Melanges Asiatiques. 1. 205, *apud* Wilson) classed with the Gandarii (Herod. VII. 66, *apud* Wilson) or Candahárees, allied with the Getæ, the Jats, or Játs of India, driven south with them by the Huns, the "Dacus missilibus melior sagittis" of Horace (Od. III. 6.) &c. &c. and Scythians notwithstanding! It appears difficult to comprehend however the nomad migratory masses of mankind can be traced, distinguished, or even classified; but there does seem a chance of studying the question on the frontier of India, upon which many of these tribes, or their remnants, were impelled in succession. To have ascertained their local presence at any point is important. It would be idle enough to attempt identification of the Dacians of Trajan's column with the *Ta hi a* of the Chinese.

I may add that the "Rhos" of Tzetzes are the 'Ρως of the LXX. version of Ezek. xxxviii. 2, 3. It is the name given to the *Russians* by the Byzantine writers of the tenth century. See Gesenius's Disquisition in v. רֹאשׁ. H. T.

phinstone's Cabul, also this Journal, April, 1838, on the Siah-posh Cafirs by Burnes). It will perhaps not be uninteresting, before I proceed to a further identification of the Greek language than has yet been attempted, as the adopted tongue of barbaric princes dominant in Bactria, to make as it were a vocabulary of the Greek words in use upon their coins. These, it will be seen, are partly imitations, and adoptions of titles and attributive epithets in use with their predecessors, the Greek Bactrian monarchs;—and partly, which is very curious, verbal applications of their own, sometimes in pure Greek; occasionally, as I shall show, in words misused and mis-spelled; and sometimes, in their later periods, in an unintelligible farrago of letters, which either represent a wholly barbarized dialect, or else indicate the ignorant attempts of a barbaric people to continue the fashion of using a language, the knowledge of which had died out. The philological value of these indisputable facts consists in the indication it gives us—

1. Of the existence in Bactria of a spoken dialect of the Greek current after the conquest of Alexander from the time of Theodotus, B. C. 256 to that of Pantaleon B. C. 120, (v. for dates Wilson Ar. Ant. C. IV. *passim*)—

2. Because, as the language of established monarchy and of the dominant class, it was continued on the coinage of their barbaric successors—

3. Preparing us for the occurrence of dialectic peculiarities, savouring of Greek origin in the language of unread inscriptions or even of spoken tongues with which further enquiry and investigation may make us acquainted.

The number of Bactrian monarchs whom Professor Wilson sees reason to class as of unblemished Greek descent, is eighteen. The attempt to adjust their chronological succession has been loosely tried, but there can be no doubt that many, if not most of them, were cotemporary kings of different portions of what had been Grecian Bactria. The numismatic evidence in our possession shows Theodotus* whom Professor Wilson does not reckon in the number above noted, Euthy-

* There is historic mention of a *first*, and *second*, Theodotus or Diodotus: I have in this paper only looked to numismatic evidences, which afford one king only of the name.

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demus, and Demetrius,* to have been the only purely Greek monarchs of Bactria; their title *king*, and their proper name simply, in the genitive case of the Greek, are given upon the coins as yet found, which have issued from their mint.

Eukratides, B. C. 181, (I give Bayer's and Wilson's chronology) is the first who gives signs of orientalisation, though in style of workmanship his silver tetradrachms are exquisite medallic specimens. He ceases to be simply *king* on all his coins: he becomes on some of them *great king*, and upon one,—the authority for this however is doubtful,—*king saviour*. The source of this amplified title is explained in the obverse of some only of his coins. His name as king; his title in Greek as great king; in Greek letters, are explained in the local dialect of the land he had adopted, and he appears in Pracrit as Mahárájá. We may trace on the one hand in the sparse employment of the Pracrit legend in the case of this monarch, and on the other in the singular bungling manner in which some native artist doubtless has tried his hand at the Greek characters (v. this Journal, June 1835, Pl. XXV. fig. 5), of his amplified title, signs of the fusion going on between the conquerors, and the conquered. His coins contribute to our vocabulary the word μεγαλος *great*, and perhaps σωτηρ *saviour*.

The name of Eukratides with the word μεγας occurs in conjunction with that of Heliokles, and Laodice on an unique coin procured by Dr.

* The reasons for which I identified with this king the name of a supposed Mayes, or Maius, are given in the January number of this Journal for 1840. Professor Wilson has done me the honour to state my argument (Ar. Ant. C. IV. p. 313. 4to.); which is he states, "*annihilated*" by the discovery of an undoubted king Mayes whom he places with justice among the barbaric princes of Cabul. A comparison of the pure Greek type of the Maius Demetrius coin (Ar. Ant. Plate VIII. fig. 18.) and its Greek inscription *only*, with the barbaric Mayes having a Pracrit legend, and an oriental title. "Great king of kings" (*ut supra* fig. 10, Plate VII. fig. 5,) might have satisfied the Professor that I have not in a numismatic sense endured annihilation, that my classical argument is good as applied to a classical subject, and that Maius Demetrius with his caduceus and Greek matronymic, and Mayes the barbarian, now treading on a prostrate figure, "now" sitting cross-legged on a couch "are not the same persons." *Maius*, μάιος "filius Maiæ," (Hor.) or Mercury; and Mayes, the Deus Lunus (*mao*, moon, Zend.) of a Scythic horde are easily separable.

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Lord, and described in this Journal (July, 1838, Pl. XXVII, fig. 1.) by, of course, our ever-lamented James Prinsep. Heliokles himself however, B. C. 147, adopted the title of *just*—δικαιος—as peculiar to himself, and this word, with its translation in Pracrit, obtains on almost all his coins.

Lysias, B. C. 147, called, himself *ανικητος—the unconquered,*—and translated the title on the Pracrit obverse of his coinage.

Amyntas, B. C. 135, varied the royal attributive to—*νικατωρ*—being the Doric form of *νικητωρ—conqueror:* this word again is the poetic form of *νικητηρ* or *νικητης* (v. Liddell and Scott's Lexicon. Oxon. 1843): I am careful to show the irregularity of the language for reasons to be given hereafter.

Agathokleia, of whom one coin alone has been discovered, is the only queen who figures in the Bactrian dynasties. Her epoch is uncertain. She called her coin, piously and ungrammatically, as being —*βασιλισσας θεοτροπο* (*v*)—of *the god-turn queen:* had *τροπος* been used adjectively, it should have been necessarily in the feminine. (?) The proper word is—*θεότρεπτος*—(Aschyl. Pers. 905) *god-sent.* She is translated in Pracrit as *maharajasa* (*not ranee*) *midatasa mikasa-klayasa.*

Antimachus, B. C. 140, boldly records on his tetradrachm his own apotheosis;—he is *βασιλευς θεος—god:* on his hemi-drachm *νικηφορος —bringing victory,* translated like the *νικατωρ* of Amyntas *Jayadharasa.*

Philoxenes, B. C. 130, has the same title and translation as Lysias.

Antialkides, B. C. 135, and Archelius, B. C. 125—120, both adopt the latter title of Antimachus.

Menander, B. C. 126, who is mentioned by Strabo (Wilson *in loc.*) as having crossed the Hypanis (Sutlej) and reached the Isamis (Jumna) river, a monarch whose extensive dominions lay to the eastward of Bactria Proper, has as title *σωτηρ—saviour*—and on one coin —*δικαιος.*

Apollodotus, who is also mentioned in narrative history, B. C. 110, continues the title *σωτηρ*; but in one remarkable coin described and figured in this Journal (August, 1833, Pl. XIV. fig. 4. June, 1835, Pl. XXVI. fig. 4) adds to it—*και φιλοπατορος*—(in the genitive)—*and father lover:* the Pracrit legend on this coin does not contain the translation of this new affix.

Diomedes, B. C. 100, and Hermæus, B. C. 98, continue the single title—σωτηρ: and the two last of the series of true Grecian monarchs Agathokles, B. C. 135, and Pantaleon, B. C. 120, are both content with the plain monarchic prefix.

We now reach the epoch of the first barbaric princes of Bactria, of whom it is sufficient in this place to say that they were Sakæ, Sakas, or Scythians, who, being says Strabo, "Asii, Pasiani, Tokhari,* and Sakarauli," engaged the Parthians, and were ultimately forced upon Ariana to the destruction of the Greek monarchies, and thence upon India, in which their progress was arrested by the prowess of Vicramáditya, king of Avanti or Oojein B. C., 56, commonly called Sakari, 'the foe of the Sakas.' (Wilson *in loc.*) Some light is thrown upon the immigration of these hordes by the accounts of Chinese historians quoted by Messrs. De Guignes and Remusat, in addition to the information afforded by Strabo and Trogus Pompeius, of the whole of which Professor Wilson has made ample and excellent use. The chain of numismatic evidence as respects these invaders commences with the name of Eu, and Su Hermæus, according to the arrangement in the Ariana Antiqua. The coins are of barbarous execution, the Pracrit characters corrupt, the Greek very much so; the title is perhaps an exemplification of the actual manner in which the word σωτηρος—*of the saviour*—was locally pronounced in a barbarized Greek dialect, viz. with the omission of the ω.

Passing over a few coins of uncertain names on which the learned have bestowed much trouble, only, in my opinion, to prove to us that they belong to a period of great internal confusion, during which the dominant chiefs could not command the services of any educated Greek, or even any competent artificer, we arrive at the epoch of Mayes B. C. 100; a barbarian king, whose barbarian title runs—βασιλευς βασιλεων μεγαλου Μαιου—*of the king of kings, of great Mayes:* this is translated in Pracrit—*Rajadhirajasa Mahatasa Ma-a-sa.*

* These people are mentioned by Ptolemy as a powerful tribe to the north-east of Bactria (Wilkinson's An. Æg. III. c. X.) and their name is read in the Hieroglyphs of Mudeenut Aboo as opponents of the Ægyptian armies. The other names tell their own history.

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A successor who repeats the Mithridatic title—*king of kings*—was Palirisus, B. C. 80, a king apparently of limited dominion and short reign.

With the coins of this prince have been found sparingly those of Spalyrius, B. C. 75. The legend is interesting as it contains a complete phrase in correct Greek, apart from the name which is in the nominative instead of genitive case:—Σπαλυριος δικαιου αδελφου του βασιλεως. *Spalyrius (of the) just (true?) brother of the king*—instead of—'*of Spalyrius*, &c. The Pracrit is read *Alabaraputasa Dhamiasa Spalapharamasa.*

The coins of Azilise, B. C. 60, and Azes, B. C. 50, continue the same ultra-regal title.

All the above legends of barbaric kings are tolerably well written with the exception of the σ and the ο, the latter of which is invariably represented by a square, but we now come to a nameless monarch who seems to have reigned, by the abundance in which his coins have been found there, in the Punjab,—who adopts new forms for several letters: he calls himself—σωτηρ μεγας βασιλευς βασιλεων—*great saviour king of kings*—and, by his mounted effigy, seems to have been a Scythian. His religion was apparently fire worship.

The Indo-Parthian dynasty of Vonones, Undopherres, and Gondophares also adopted for their coins Greek legends with a Pracrit obverse, the titles *saviour* or *king of kings*. The name Abagases has been once read—*Akaja Kubhasa* in the Pracrit as noted in this Journal (July, 1838, Pl. XXVIII. fig. 16,) and classed in connection with this dynasty; to which also Kodes or Hyrkodes must be considered to belong. His coins have a Greek legend only, and are remarkable as presenting us with an addition to our vocabulary—μακαρος—*blessed*. It is used with a word, the corrupt Greek letters of which may read *Ordeethro*, or *Ordeoro;* the root of it is evidently Zend.

"We now come," says Professor Wilson, "to a long and important series of coins, the issue of princes of well defined names and unquestioned Scythian descent," of whom "Kadphises is the earliest." The dominion of these potentates seems to have been about Cabul and Jullalabad, spreading occasionally along the Indus, and into the Punjâb. The dynasty consists, as far as is at present known, of Kadphises, or Kadaphes,—Kanerkes or Kanerkis,—Kenorano to Ooerki,—and a

certain Baraono, to whose coinage seems to have succeeded that of Ardokro, with which the use of Greek letters died out, the language as applied to numismatic legends having already all but disappeared. I cannot help being of opinion that the last name is not that of a reigning monarch but of a tutelar deity. The words Mioro or Mithro, Mao, Okro, and Ardokro on the Kanerki coins with their accompanying symbols, refer, says Professor Wilson, to the Mithraic worship favoured or introduced by that prince. There can be little, if any, doubt of the fact.

This Indo-Scythian group of potentates presents to the philologist matter of very peculiar interest. The earliest king (or kings) introduces new Greek words as descriptive of regal merit and dignity in conjunction, to a certain degree, with the old "king of kings" title, and even appears, as I read the words, to place upon his coin a familiar expression of vernacular Greek. His successor (?) alternates the Grecian form of the title above noted with its equivalent in Hindee, *Rao Nana Rao*: and continues to affix, after his name, with this title current in India to this day, the corrupt form of a Greek appellative! Later kings fall, as I have noticed, into total barbarism of language and expression.

This group of coins has afforded numismatologists much trouble, and their difficulties are epitomised by Professor Wilson in the legends, some of which I give in simple Greek characters.

1. *Κορσο κοζουλο καδφιζου*—Pl. XI. f. 10, Ar. Ant.
2. *οσονηλυο*—Pl. XI. f. 12, ditto.
3. *οηυοχ φηομο*—Pl. XI. f. 13, ditto.
4. *ζαθου κοζολυ καδαφες κορανο*—Journ. As. Soc. B. June, 1835, Pl. XXIV. and Sept. 1836, Pl. XXXV.
5. *ραο νανο ραο κανηρκι κορανο*—Pl. XII. fig. 3, Ar. Ant.

"It may," says the Professor, "furnish some clue to the origin of these coins, that as far as we can conjecture the purport of their legends, the title of king is wanting on the reverse of all, and also on the obverse of the coins which bear the names of Kadaphes and Kadphises. What may be the meaning of Zathou, Korano, or Korso in the Greek, it is impossible to say, or whether either (any?) of them be equivalent to king: the latter recurs in the coins of Kanerkes in a position in

which it cannot well have that signification. Neither (none?) of the others bear a resemblance to any Turkish title, as Beg or Khan. It is said indeed that the Sakas when subdued by the Yui-chi had no king: and it is elsewhere mentioned (?), that in the century before our era they had abolished royalty, and remained under the command of military chiefs; and hence possibly the adoption by them of the portraits and types of Hermæus at various times, and the insertion of names and epithets unconnected with royalty. These coins therefore might be the issues of different military officers of the Sakas, during the latter half of the century that preceded the Christian era, and the establishment of the kingdom of the Yui-chi; in which case the conjecture that these coins bear the name of the Yui-chi prince, Kiu-tsiu-kio, would fall to the ground." (v. also Ar. Ant. on the same subject pp. 358-59, 4to.)

In dealing with the difficulties above set forth, it must be recollected that we have to do with a dialectic difference, as I read it, of the Greek, which had, as we have already seen, become even in Græco-Bactrian periods, incorrect, not to say corrupt; but strange to say, it is not the less in its elements Grecian, as I shall proceed to show. Should my brief dissertation appear a little pedantic, I trust it may be excused on the ground that the subject is new and curious, and one which the savans of Europe have, by their tacit concurrence with the dicta of Professor Wilson, pronounced inexplicable.

As to the first word then, in the legend No. 1, κορσο, I must remark, with reference to those which will form the matter of our sequent enquiry, that it is intended to be in the genitive case, the legends of this period giving us ο, and even υ for the genitive ου: the nominative of this word would therefore be κορσος. The word κορση which in old Homeric Greek* (Il. 4, 502, 5, 584,) is used plurally for the temples, or sides of the head, and more modernly in a poetic sense for the head, is the root whence this barbarized substantive has been derived. There is a legitimate Greek noun κορσης (one who cuts or shaves the hair), but it springs from quite another origin (κειρω—to clear or shave). The attempt has been evidently made in the rude word before us to impersonize *the head*, as alluding to the qualifications of the individual

* Sans. çeersha: root, κάδα.

to whom it is applied to head or lead a tribe or people. It is in fact, however irregularly, the philological equivalent of our common and popular English word, *header*.

The next difficulty in legend No. 1, is simplified by looking on the word at once as composite: there is no such, nor the semblance of such in Greek. It appears on the legends with different spellings, the second syllable being at one time vowelised with *o*, at another *ου*. As respects this difference, I refer the reader in the first instance to the Greek dialectic differences which I have detected in the pure Græco-Bactrian period; and then remind him of the Doric (which we have already found in the coins), and Æolic permutations of *ου* for *ω*; and in the latter dialect of even *o* for *ω*; sufficient, as critics too well know, to warrant in pure Greek literature a wearisome variety of readings. It is no stigma on our scholarship, if we explain the barbarized written form of a rude spoken (?) dialect by a reference to these varieties. I read the word as—*και οζωλου*, the *και* being abbreviated as in *κάν* for *κὰι ἄν*—*κάλον κάγαθον* for *και αγαθον*:—* the adjective being formed from ὄζος—a branch,† and metaphorically, a scion or offshoot (ὄζος ἄρηος Il. 2, 540.): its meaning therefore is that of *brancher*, *branch-giver*, or *branch-leader*. I read the legend No. 1, in English—of the header and branch-leader Kadphises.

Before quitting the subject of this legend, I may quote a very curious passage in the elder Pliny (B. 17) which bears upon the Scythic use of the word *Chorsus* or *Chorsas*, as descriptive of the heads or

* As authority for the absorption of *αι* in a legend vowel, I cite from a fragment of Archilochus (apud Ammonium) given as follows in De la Roviere's Greek Poets, (Ed. Colon^{æ} Allob^{m}. 1614)—

ὡς ἄρ' ἀλώπηξ τε κἀετός
ξυνωνίην ἔθεντο

M. Mure (Crit. Hist. Gr. Lit. v. III. 56,) quotes the line from Bergk's Poett. Lyrr. 487, fig. 91, thus—

ὡς ἆρ' ἀλώπηξ κἀετὸς
κ. τ. λ.

As examples, both readings favour my hypothesis too plainly to need further exposition. H. T.

† Scholars who might assign a derivation less complimentary to Kadphises, are requested to remember that *that* adjective is ὀξόλης.

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leaders of a tribe. I need hardly remark that, chronologically speaking, there would have been ample time for the adoption of the (foreign) term as a national phrase before Pliny wrote of the Scythians;—and I may mention that I believe the word, which occurs in no dictionaries (?), is not to be found elsewhere in any classic of authority. Should my Greek derivation be thought arbitrary, I have yet a meaning indigenous among the (Indo) Scythians for the first word in the legend in the passage as follows:—"Ultra sunt populi Scythorum: Persæ illos Sacas universos appellavere aproximâ gente; antiqui Aremeos; *Sacæ ipsi Persas, Chorsaros.*"

The legend No. 2, occurs also on a coin of Kadphises, marking the commencement of the introduction of a Mithraic worship which became generally current in the time of Kanerkes, whose coins bear indifferently the Greek ἥλιος, or the Zend Græcised *μιθρο*. It is slightly barbarized by the omission of an ι; or perhaps rather the use of υ for ι: it reads easily.

ὅσον ἡλιοῦ—as great as the Sun.

The legend, No. 3, I introduce, not to explain it, but to give such readers as are new to this branch of study a fair specimen of the unintelligible; together with my assurance that there is infinitely more of the like found, and to be found, which patience, ingenuity, and the spread of intelligence will make patent to us; of course if labourers be found where the vineyard is so large and fruitful. The second word gives an idea of the Greek *φημη*.

Legend No. 4 contains the three words, one of which I have explained, which constitute the despair of the author of Ariana Antiqua. They are not the less Greek, very slightly barbarized. The use of the first however, as applied personally, argues the same corruption of language, traces of which have already met us;—*ζαθος—ζαθεος—divine, godlike, majestic; φρυγῶν τε ζάθεοι σελᾶναι* (Eurip. Troades, 1074.) being used by Homer (in the Iliad only) as also by Hesiod and Pindar as applicable to places and cities frequented by the gods, (in the same sense as ἠγαθεος in relation to ἀγαθος). Here the rude dialect applies it to the king Kadaphes, who also assumes the ὀζωλος title, and adds as his sovereign designation, the Greek word, doubtless as it was barbarously pronounced,—*κοιρανος*:—*κοιρανου—κορανο*. When Mr. Masson vaguely guessed, the word

meant "a military chief," he was right. It occurs joined with ἡγεμών (Il. 2, 487: also, Il. 7, 234, κοίρανε λαών), and joined with βασιλεύς (Il. 2, 204); but is ordinarily used as *lord* or *master*, in which sense the well known line of the Iliad, οὐκ ἀγαθὸν πολυκοιρανίη, εἷς κοίρανος ἔστω—gives two instances. It may be fairly taken on these authorities as "equivalent to king;" and I read No. 4, in English therefore—

*Of the divine and branch-leading Kadaphes king.**

Legend, No. 5, gives us the interesting spectacle of this pure Greek word in vernacular contact with one which still forms part of the spoken Hindee of this country—

Of the king of kings Kanerkes king (or Lord).

It is interesting as part of the speculation which represents the people over whom this dynasty ruled as being under military chiefs or

* Prof. Wilson says (Ar. Ant. p. 358-9)—"With regard to the epithet, if it be an epithet, Korano, it has already been observed that Mr. Masson considers it as denoting "chief" or "military leader" at a time when Indo-Scythians had substituted military chiefs for kings. No authority is given for the meaning, and it would be obviously incompatible with the use of the words Rao and Basileus with which Korano is associated." This assertion the Professor makes, as he tells us in the title-page, "*under the authority of the Hon. the Court of Directors of the East India Company:*" it is against that of Hesiod (Works and Days, 261) and of Homer as in the Hymn to Ceres, and of Herodotus and of Plutarch in their lives or notices of Homer (v. Mure's Critical Hist. Gr. Lit. Vol. 2, appendix F.) "The title Basileus frequently occurs in the Works and Days" says, Mr. M. "but in the plural number and evidently denoting an aristocratical magistracy acting also as judges similar to the Archons of Athens, or the Prytanes of Corinth and Corcyra." By historic analogy we thus arrive at an idea of the political character of these princes of Cabul and the Punjab who were *civil judges* (*βάσιλεις*) and *military leaders* (*κοιρανοι*) or *lords*, the feminine of which title Aristophanes uses for lady.

To put an end to all doubt as to the value of these several titles, I append Johannes Tzetzes the Grammarian's remark on an Orphic distich which he quotes in his Commentary on Lycophron's Cassandria 523, "showing the difference of these."

ἔσται δ' ἄν τις ἀνὴρ ἢ κοίρανος ἠὲ τύραννος
ἢ βασιλεὺς ὅς τῆμος ἐς οὐρανὸν ἴξεται ἀπτὴν.

(Apud Lobekii Aglaophamum, lib. II. Sec. 3.)

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lords in the Punjab, and as having abolished royalty, to detect in one of the epithets of these potentates an indication of the leader of a sect or branch: and it is curious, as history is ever a repetition of herself, to discover in this rude community the prototype of the Sikhs, divided into their ὄζοι or *Missuls*, before the dominant influence of the great and wise Runjeet had consolidated their power into the union of a monarchy.

The last observation which I have to offer respecting these coins is a conjecture as to a very peculiar legend of Kadphises in which, in a very perfect silver specimen (the only Indo-Scythian silver coin yet (1841) found), there occurs after βασιλευς βασιλεων μεγας the inexplicable word OOHMO. A similar barbarism occurs on a large copper coin of this king after the words βασιλευς βασιλεων σωτηρ μεγας written ΘOMHN. It varies apparently on other coins to OOH, ΘOK, OOHK, OOKM. Is not the first a barbarized effort to write ὃ ἐμοῦ—*who* (is) *of me*, i. e. my? And the second a like attempt to express ὃ ἡμων—*who* (is) *to us*, i. e. our? The reduplication of the o would express the aspirate, and even classical authority (οὗμος for ὃ ἐμός being the Attic contraction; found also Il. 8, 360,) admits the running of the words together. We thus have a curious and familiar legend in both cases.

*1. *King of Kings Great my (of me) Kadphises.*

2. *King of Kings Saviour Great to us Kadphises.*

The other barbarous legends are natural mistakes on the part of ignorant die-cutters directed to employ a new form of words. These, which are barbarisms of execution, are thus easily accounted for: the barbarisms of diction, I would submit, are no where so great in the legends of these coins, as in the barbarous, but still intelligible Greek of the Triballus of Aristophanes, who says (it is his longest speech)—

καλάνι κόραυνα κὰι μεγάλα βασιλιναῦ
ὄρνιθι παραδιδωμι. †

* The Pracrit-translated legend should assist us in both these instances, but the reading of the first is declared by Professor Wilson as doubtful, and the second is entered by him illegible at the very point in which we require it.

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† 114-115 lines of the last scene of "the Birds." ποσειδων. τριβαλλος. ἡρακλης. πεισθεταιρος.

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Indeed I rather think our Bactrian and Indo-Scythian barbarisms gain by the comparison. Our κορανο is surely preferable to the drawling feminised κορανα of Triballus; while the βασιλισσα of Queen Agathokleia is so superior to the Triballic corruption of βασιλιναῦ, that one utterly forgives her the ungrammatical memory in which her name is perpetuated. It is a curious and not unvaluable coincidence that gives us in this one line, two of the words for comparison of our slender numismatic vocabulary.

It now only remains to record one or two reflections which naturally ensue upon a review, such as has been here attempted, of indistinct and obscure material for history. The question that suggests itself is, —if the subject does not contain much in itself, to what does it point as a subject for enquiry? The exploration of Kafiristan is one point; and the study of the immigration of nomad tribes into this country another. The first must of course depend upon far other than scientific authority: the second is in the power of any man reasonably familiar with the language and manners of the natives of Upper India. Passing by the latest colony that has settled itself in the land, the Pathans of Rohilkhund, I would suggest the study of that singular race, the Goojurs stamped still with the type of nomads, so lately has their immigration been into Upper India, and from them to the Juts or Jâts, the Thuggas, and other anomalous tribes. All have their traditions, and their simple records, and I suspect that it will be eventually from them, critically examined, that the real internal and popular history of the country will be, if it ever is to be, elicited.

Numismatics are but partially available to this end; but their value is immense; and, with reference to dark portions of history in particular, their study should never be remitted, nor discouraged. It is always unfortunate when any declaration is made *ex cathedra* in science to the effect that a thing is "impossible:" it is equivalent to the act of the disappointed votary who would brick up the archway of the temple because it was not his fortune to make his entry into its penetralia. Much as we owe to Professor Wilson, we do not the less feel that the study of Indo-Bactrian numismatics sustained a check in his announcement that philological discovery was not to be thought of in some of the most salient points of our most interesting period.*

* With reference to the march of discovery, I may mention that whereas in a

When therefore, with all the reverence due to this eminent and respected man of letters, I venture at this particular time to prove that his assertion was erroneous, it is in the ardent hope of resuscitating among our countrymen in the east, and more particularly among the members of this Society, a study which the present position of our Anglo-Indian empire seems so peculiarly to favour.

Report on the Mammalia and more remarkable species of Birds inhabiting Ceylon.—*By* E. Blyth.

The following notices of the mammalia and birds of Ceylon are founded chiefly on two cases of specimens forwarded for examination by Dr. E. F. Kelaart, of the Ceylon Medical Service, and upon the former contributions of Dr. Templeton, E. L. Layard, Esq., and A. O. Brodie, Esq., but especially of Mr. Layard, who continues very zealously to investigate several branches of the zoology of the island.

MAMMALIA.

Quadrumana.—Of five species (or very distinct races) of Monkey in Ceylon, one only is known to inhabit the neighbouring mainland. This is Presbytis priamus, Elliot, nobis (*J. A. S.* XIII, 470, XVI, 732), the small crested *Húnumán* of peninsular India, which is common in the Jaffna peninsula at the extreme north of the island, and probably to some distance farther south: but generally over the low northern half of Ceylon, we have in its place the Pr. thersites, Elliot, nobis (*J. A. S.* XVI, 127, XVII, 248), a very similar race but

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recent paper in the Journal, I quoted Bunsen's new Egyptian chronology, I have now lying before me (sent from England by our able friend, Mr. Laidlay) the thirteenth edition of Gliddon's Ancient Ægypt, in the appendix to which he notes that the more recent discoveries of Lepsius and the Prussian literati "will carry the age of Menes some centuries beyond B. C. 3643, back by the incontrovertible testimony of the Pyramidal *monuments*."

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nearly as large and powerful as Pr. entellus of Bengal, and which is further distinguished from Pr. priamus by having no abruptly rising compressed vertical crest, nor the radiating centre of hairs a little behind the brow seen in the various other entelloid Monkeys. Its white beard and whiskers are also more conspicuously developed, and contrast strongly with the black face and dark body. According to Dr. Kelaart, they are respectively known as the *Maha* or ('great') *Wanderoo*, and the *Sadoo* (or 'white') *Wanderoo*. The Pr. cephalopterus he indicates as the *Kaloo* (or 'black') *Wanderoo*, and the Macacus sinicus as the *Riláwa* of the Cinghalese.* Mr. Layard states that Pr. cephalopterus is "the common black Monkey of the maritime provinces, very common also in the Kandyan districts; about Trincomali it is replaced by Pr. thersites, and in the Jaffna peninsula by Pr. priamus, which last is particularly abundant about Point Pedro."† Dr. Kelaart, however, has now presented the Society with a fine adult male of the mountain or Kandyan representative of Pr. cephalopterus from Newera Elia; and it is quite as different from the small animal of the coast as Pr. thersites is from Pr. priamus. General aspect the same, but considerably larger and more powerful, with a much longer and very full coat, the piles on the sides measuring 4 to 5 in. long:‡ colour nearly uniform greyish brown-black, with contrasting long white whiskers; the brows, hairs on cheeks, and those on the hands and feet, are deep black; there are traces of a paler tinge just perceptible on the occiput and about the croup; and the terminal three-fourths of the tail are grey. Entire length of hand 5 in., and of foot 6½ in. It is probable that this mountain animal varies in colour like Pr. cephalopterus of the coast, to black, grey, grizzled, or light rufous-brown; but all we have seen of the latter race

* Here it may be repeated that the name *Wanderoo*, as applied to Pr. cephalopterus in particular, has been transferred by most writers to a widely different Monkey, of merely somewhat similar colouring,—the Macacus silenus, which inhabits Travancore and Cochin, but has not been observed wild in Ceylon.

† According to a letter since received from Dr. Kelaart, Pr. priamus would seem also to inhabit the hilly country about Kandy.

‡ In this it resembles the other mountain species of the genus, as the Himalayan *Lungúr*, Pr. schistaceus, Hodgson, (a very strongly marked race, for habits of which vide *J. A. S.* XIII, 472,) and in a less degree Pr. Johnii of the Nilgiris.

have had the albescent hue of the croup strongly contrasting, much more so than in Pr. Johnii of the Nilgiris, and the head generally brown as in the latter species, contrasting (though less so than in Pr. Johnii) with the black of the body (vide *J. A. S.* XVI, 1271). Should it be deemed worthy of a name, it might be designated Pr. ursinus.* Other species nearly affined in all but colour to Pr. cephalopterus, are Pr. pileatus, nobis, from the Tippera, Sylhet, and Khásya hills, and Pr. maurus, (L.), from Java. In fact, most of the black and rufous species of Presbytis are very closely affined, and several that are undoubtedly distinct are only separable apart by what might be considered trivial and insufficient distinctions. Another quadrumanous inhabitant of Ceylon is the Stenops gracilis, which is also found on the Coromandel coast.

Cheiroptera.—The two common frugivorous Bats of India generally, Pteropus edulis (vel Edwardii, &c.), and Cynopterus marginatus, are equally abundant in Ceylon. Dr. Kelaart sends a third, which is probably Pt. Leschenaultii, Dumeril, though not completely according with the descriptions. This small *Roussette* (or 'Flying Fox') measures about 6 in. from muzzle to tail-tip, the tail being about $\frac{3}{8}$ in., and having its basal third invested by the interfemoral membrane. Expanse 19 or 20 in. Head $1\frac{3}{4}$ in. Ears $\frac{5}{8}$ in. Radius 3 in. Tibia $1\frac{1}{2}$ in. Foot with claws 1 in. Upper-parts very thinly covered with short downy fur, of a dull brown colour; lower-parts rather more densely covered with much paler brown fur. A specimen procured by Mr. Elliot somewhere on the Coromandel coast

* "At Newera Elia, and scattered over the colder parts of the island, is a species of very large Monkey of a dark colour: some of those I saw were much bigger than the *Wandura*; and one that passed some distance before me, when resting on all four feet, looked so like a Ceylon Bear" *(Ursus labiatus)*, "that I nearly took him for one." Forbes's 'Eleven Years in Ceylon,' II, 144. In a letter recently received from Dr. Kelaart, he remarks that he has now several specimens of this Monkey, one procured within 20 miles of Kandy. "Not one of them has the grey croup of Pr. cephalopterus, and the hairs of the hands and feet are, in all, jet black. The ferruginous tinge of the hairs of the head and the grey of the occipital are present in all. The arms, too, are shorter than in Pr. cephalopterus of the low country. So that we may now consider this animal as distinct and confined to the mountainous regions of Ceylon—only in the Newera Elia specimens, the fur is longer and the tail more albescent."

appears to be of the same species; but has the upper-parts much more fully covered with brown fur, darkest upon the crown, and a whitish collar round the lower part of the neck. The hair on the sides of the neck is longish and directed forward. Length of radius 3¼ in. The difference partly depends, no doubt, on the season in which the specimens were obtained: and the only other frugivorous Bat known to inhabit India is Pt. Dussumieri, Is. Geoff. (vide *J. A. S.* XII, 176).

Taphozous longimanus, (Hardwicke), is a species and genus added by Dr. Kelaart to the fauna of Ceylon.*

Megaderma lyra, Geoff. (v. *M. carnatica*, Elliot, et *M. schistacea*, Hodgson), appears to be common.

The species of Rhinolophinæ would seem to be numerous. Of true Rhinolophus, Mr. Waterhouse gives Rh. insignis, Horsfield, with a mark of doubt against the specific name, from Ceylon, in his Catalogue of Mammalia in the museum of the Zoological Society (1838); and we have seen no true Rhinolophus from the peninsula of India, unless Rh. mitratus, nobis (*J. A. S.* XIII, 483), from Chaibasa be deemed an exception.† But of Hipposideros, Gray, there appear to be many species in Ceylon. Of the three noticed in Mr. Elliot's Catalogue of the mammalia of the S. Mahratta country (*Madr. Journ.* X, 98), viz. H. speoris, H. murinus, and H. fulvus (vide, *J. A. S.* XIII, 489), the first two are common; and H. ater, Templeton, is a third described in *J. A. S.* XVII, 252. The last we have not seen; and Dr. Kelaart now sends two species additional to a specimen of H. murinus. These are probably H. vulgaris, (Horsf.), apud Gray, of India, and H. pusillus, (Tem.), of India, the specific name given with doubt by Mr. Waterhouse (*Catal. Zool. Soc. Mus.*). The first, though nearly affined to—is certainly not identical with—Rh. vulgaris apud nos, *J. A. S.* XIII, 488, from Arakan. Length about 3 in., of which the tail is $\frac{11}{16}$ in.; expanse about 12 in., or nearly so; radius 2 in.; tibia $\frac{7}{8}$ in.; ear-conch $\frac{1}{2}$ in. The membrane surmounting the frontal pits exhibits three distinct small longitudinal

* T. brevicaudus, nobis, *J. A. S.* X, 970, is another species likely to occur, as it was described from a specimen procured in Travancore.

† In a letter, Dr. Kelaart informs us that he has now obtained a very large Hipposideros, and likewise a Rhinolophus as this genus is at present restricted.

ridges. Fur of the upper-parts pale greyish-brown at base, then dusky-brown which gives the prevailing hue of the surface, with very slight pale extreme tips. Lower-parts nearly uniform brown, with also slight hoary tips. Membranes dark. The other (H. ATER?) is smaller, and possibly a variety only of H. MURINUS, which (so far as can be traced in the dry skin) it resembles in structure. Colour whitish above, with blackish tips to the fur, the two colours being equally conspicuous; and below whitish-brown. These Bats cannot be properly described unless when fresh or preserved in spirit.

The genera RHINOPOMA and DYSOPUS have probably yet to be discovered in Ceylon. No doubt RH. HARDWICKII and D. PLICATUS exist there.

Of ordinary Bats (VESPERTILIONINÆ), the NYCTICEJUS HEATHII, Horsfield, appears to be very common, as generally over the peninsula of India. In Bengal it is replaced by a smaller species of similar colouring.* N. BELANGERI, (Tem.), is common to India generally and the Burmese and Malay countries, being in Ceylon equally abundant. To these Dr. Kelaart adds another of about the same size, which was long ago forwarded from Chaibasa in Central India by Capt. S. R. Tickell, and may now be described as

N. TICKELLI, nobis, *n. s.* Length $4\frac{3}{4}$ in., of which the tail measures $2\frac{1}{8}$ in.; expanse 16 in.; length of fore-arm $2\frac{3}{8}$ in.; of longest digit

* N. HEATHII, Horsfield, *P. Z. S.* 1831, p. 113. Length (of an adult male, in spirit,) 6 in., of which the tail measures $3\frac{1}{8}$ in.; alar expanse $16\frac{1}{2}$ in.; fore-arm $2\frac{1}{8}$ in.; longest finger $4\frac{1}{2}$ in.; tibia $1\frac{1}{8}$ in.; foot with claws $\frac{9}{16}$ in. The difference of bulk and of size of the head, on comparison of this with the next species, exceeds that of the linear dimensions. The skull, also, with the teeth, is much larger in N. HEATHII, measuring $1\frac{1}{4}$ in. in length, inclusive of the sagittal ridge and more protruding lower jaw; the upper canines project more than $\frac{3}{16}$ in. from their bony sockets. HAB. Central and S. India, and Ceylon.

N. LUTEUS, nobis, *n. s.* Length (of a large male) $5\frac{1}{8}$ in., of which the tail measures $2\frac{1}{4}$ in.; expanse $14\frac{3}{4}$ in.; fore-arm $2\frac{1}{4}$ in.; longest finger $3\frac{3}{4}$ in.; tibia $\frac{15}{16}$ in.; foot and claws $\frac{1}{2}$ in. The entire length of skull is barely 1 in., inclusive of the greatly developed sagittal ridge. HAB. Bengal; Coromandel.

In structure, both resemble N. BELANGERI, and both have the upper-parts, when fresh, of a very rich tawny or golden-brown colour, having a slight greenish cast; the lower parts fine yellow, more or less deep, and not unfrequently tinged with fulvous. By exposure to light, the colours fade much in both species, the rich yellow tinge gradually disappearing.

4¼ in.; tibia 1 5/6 in.; foot with claws ½ in.: ears anteally, from lowermost base, ⅝ in.; and externally hairy for the basal half. Fur moderately long, soft, and straight, or a little wavy; of a pale fulvescent or whitish-fulvous colour, more or less tinged with maronne or vinous on the back: the membranes dusky, marked along the digits as in KERIVOULA PICTA, but the brighter colour spreading less upon the membrane, though the interfemoral is chiefly or wholly of this hue. There is a considerable growth of hair upon the basal half of the interfemoral membrane above, also along the tibia, and especially upon the toes: the face likewise is hairy around the eyes, and on the muzzle. Ears triangular and obtusely pointed: the tragus broad and semi-circular, and suddenly narrowing at tip. Lastly, the dentition exhibits a peculiarity; this animal having a short, flat, obtusely trilobate or quadrilobate second pair of upper incisors, situate posteriorly to the usual large pair, and immediately behind the contact of each of the latter and the canine of the same side. This we have seen in no other species. HAB. Central India, Ceylon, and doubtless the intervening hilly country.

KERIVOULA PICTA, Gray; *Vespertilio pictus*, Pallas (originally described from Ceylon); *V. kerivoula*, Boddaert: *Kehal voula*, Cingh. (Kelaart). Specimens sent dry and in spirit by Dr. Templeton and Mr. Layard are perfectly identical in species with one received from Java; and Dr. Cantor met with this species also at Pinang. Schinz gives it from Java, Sumatra, Borneo, and, doubtfully, Ceylon. Mr. Layard says of it, "I have only met with this species about Colombo in any abundance, and I obtained one solitary specimen at Ambegamoa." Mr. Gray notices a K. SYKESI (we believe still undescribed), from "India, Calcutta;" this we do not know: but in Lower Bengal (where apparently very rare) and in Central India, there is a fine species of nearly the same remarkable colouring, which is likely to be sometimes mistaken for K. PICTA, though differing from it in many particulars. It appears to be VESPERTILIO FORMOSUS, Hodgson, *J. A. S.* IV, 700, assigned by Mr. Gray to his KERIVOULA, though improperly if it be the species here referred to, which accords in the number of its teeth with Mr. Hodgson's description, supposing that its exceedingly minute second upper præmolar was overlooked. This species and K. PICTA and NYCTICEJUS TICKELLI present the same

remarkable and beautiful style of colouring; but the dentition and other characters differ.* The NYCTICEJUS has the short and very broad muzzle, strongly developed sagittal, occipital, and parietal crests, and comparatively powerful teeth with the upper *carnassiez* adjoining the canine, which we observe in N. HEATHII and the species affined to it; and there are two præmolars below, of which the second is the longer. VESPERTILIO FORMOSUS (?) has three præmolars below, of which the medial (or that next to the *carnassiez*) is minute; and the upper *carnassiez* is widely separated from the canine, and in the interval are one developed præmolar, and posterior to this another which is excessively minute and liable to be overlooked: there are no ridges to the skull, or the middle one is barely traceable; the muzzle is comparatively narrow; and there are two upper incisors on each side of equal size: chaffron a little concave. In KERIVOULA PICTA the chaffron is highly concave, the muzzle again much narrower, and there are two pairs of upper incisors of which the inner are longer, and so placed that on a direct front view they are alone visible, the second pair being concealed behind them; in V. FORMOSUS (?) the four are equally visible on a front view. There are two præmolars of equal size between the upper canine and the *carnassiez*, and two below of scarcely inferior size to the third or lower *carnassiez*. Lastly, the ears of V. FORMOSUS (?) are not those of a KERIVOULA (as exemplified by K. PICTA), but are deeply emarginated externally at one-third of their length from the base, and above comparatively narrow and obtusely pointed: tragus also broader, shorter, and less attenuated at tip.

The only other Bat we have yet seen from Ceylon, is a minute species which appears to be extremely common throughout India, and is also met with at Singapore. We believe it to be V. COROMANDELICUS, F. Cuv., and to be identical with V. IRRETITUS, Cantor (*Ann. Mag. N. H.* IX, 481), from Chusan; and V. MINUTUS, Temminck, from the Cape of Good Hope, would seem to approximate, so far as can be judged from the brief description of Prof. Schinz. Size of the Pipistrelle,† or on the average somewhat shorter in the

* We have since received another and remarkably handsome large species of NYCTICEJUS, with similar colouring of membranes, from the Khásya hills,—N. ORNATUS, nobis,—a description of which will appear in a subsequent article.

† On comparison of British specimens of the Pipistrelle with an example in spirit sent by Mr. Hodgson from Nepal with the MS. name *V. pallidiventris*, we could

fore-arm, which does not exceed 1⅛ in. in length; longest digit 2 to 2⅛ in.; expanse rarely exceeding 7½ in.* Total length 2⅝ in., of which the tail measures 1⅛ in.; ears broad, exceeding ¼ in. in length; tragus ⅛ in., appearing lanceolate in the dry specimen, but in the fresh animal somewhat lunate, or a little curved forward and obtuse at tip. The fur is short, as compared with that of the Pipistrelle, and dingy fulvous-brown above at the surface, below paler and greyish-fulvous: membranes dusky. The skull rather exceeds ½ in. long: the upper *carnassiez* is all but contiguous to the canine, and there is a minute præmolar situate internally and not visible externally; and two lower præmolars, of which the second or *carnassiez* is longer by about a third than the first. This Bat belongs to that large division of SCOTOPHILUS, Leach (apud Gray), the species of which have permanently two pairs of small upper incisors of about equal size: to these we prefer to restrict the name SCOTOPHILUS, reserving NYCTICEJUS for those in which the adults have only one large incisor on each side. Accordingly, we term it (though somewhat doubtfully) SCOTOPHILUS COROMANDELICUS. This diminutive species is remarkable for the extreme velocity of its flight, as particularly shewn when darting about a room after being molested; and it is the most common of the small Bats about Calcutta. Mr. Hodgson did not meet with it in Nepal, and it probably does not inhabit the sub-Himalayas. It is the No. 12 of Mr. Elliot's list in the 'Madras Journal of Literature and Science,' X, 99.

CARNIVORA.—Dr. Kelaart sent flat skins of what he considered to be two varieties of Jackals: but we regard them as mere individual variations of colour, such as are seen in all parts of India. No other wild canine animal has hitherto been discovered in the island.

Of VIVERRIDÆ, the Civet of Ceylon is probably not VIVERRA ZIBETHA, L., as supposed by Mr. Layard, but of a race procured by Mr. Walter Elliot from Travancore, and of which a specimen exists in the museum of the Zoological Society, referred to V. ZIBETHA in Mr. Waterhouse's Catalogue of the mammalia in that collection (1838), No.

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discover no difference whatever. According to Schinz, the same species further inhabits Japan.

* Dr. Cantor gives 8 in. as the expanse of his *V. irretitus*, but the other measurements sufficiently correspond.

252. In that Catalogue it is marked "Sumatra, donor, Sir Stamford Raffles;" but we are the more inclined to suspect a mistake, both as regards the donor and the habitat, from its being stated (formerly at least) on the label of the specimen to have been presented by the Duke of Northumberland. Both Mr. Elliot's Travancore specimen and that in the Zoological Society's museum exactly resemble the African V. CIVETTA, except that the dorsal mane ceases between the shoulders, instead of being continued forward to between the ears.

VIVERRICULA MALACCENSIS, (Gm.), and PARADOXURUS TYPUS, F. Cuv., sent by Dr. Kelaart, as previously by Mr. Layard, are perfectly similar to Bengal specimens. There is also in the island P. ZEYLONICUS, (Schreber), a very young example of which was formerly sent to the Society by Dr. Templeton, then of Colombo. This young animal is uniformly of the colour of the upper-parts of MUSTELA VULGARIS, merely a little paler below, and shewing no decided trace of the longitudinal dorsal stripes. A living pair was afterwards presented to us by A. O. Brodie, Esq., of Putlam. These were then not fully grown, and were paler than the last, with the limbs darker, and the three longitudinal dorsal streaks distinct. The female died in this colouring, and is now preserved in the Society's museum; but the male still lives, and has become considerably deeper in his general hue. Of two specimens now sent from Newera Elia by Dr. Kelaart, one is again deeper-coloured than the living male, except its tail which is paler, and the dorsal stripes are inconspicuous though distinctly traceable: the other is much darker, considerably more so indeed than LUTRA VULGARIS, with remarkably handsome fur, and no trace of the dorsal streaks; the tail paler, with a subterminal yellowish-white ring,—exhibiting thus the tendency to partial albinism which is so often observable about the tail-tip, and sometimes the feet and even the body, of animals of this genus, as especially the common P. TYPUS. We do not hesitate in considering all these varieties of colour in different specimens of P. ZEYLONICUS to have no specifical importance; but upon present data it seems probable that those which inhabit high upon the mountains (*P. montanus*, Kelaart,) have finer and darker-coloured fur than those of a lower region.

There are four species of Mungoose (HERPESTES) in Ceylon: H. VITTICOLLIS, (Bennet), is not uncommon in the interior; and H.

GRISEUS, (Geoffroy), appears identical with the race of Bengal, the nose and paws of the only specimen we have seen being, however, considerably darker. This specimen was sent by Mr. Layard from the Jaffna peninsula; and he remarks that there is "another variety at Trincomali which accords exactly with the Indian animal." Dr. Kelaart states, in a recent communication, "I have now two other species of HERPESTES besides the H. GRISEUS and H. VITTICOLLIS, —one like H. AUROPUNCTATUS, Hodgson, but not it: it is very like H. GRISEUS, except that the grey of the hair is in this fulvous or yellow (if new, *H. fulvescens*, mihi): the other is of a dark ruby-red; tip of tail and feet black; ferruginous-red face; and as large as H. VITTICOLLIS." The former of these is probably H. AUROPUNCTATUS; and the latter, we have little doubt, is a very distinct species formerly sent on loan by Mr. Elliot, who procured it in the south of India, but has not yet given it a name, so far as we are aware. His specimens, however, were smaller than adult VITTICOLLIS, and more affined to GRISEUS in structure.*

FELIDÆ. Of Cats, there are, in Ceylon, F. PARDUS (vel *leopardus*) and its black variety, F. VIVERRINUS, and F. CHAUS. F. TIGRIS and F. JUBATUS are unknown: and F. BENGALENSIS (var. *wagati*, Elliot), and F. RUBIGINOSA, Is. Geoffroy, (both inhabitants of peninsular India,) remain probably to be discovered.

MUSTELIDÆ. The only Otter we have seen from the island is LUTRA NAIR, F. Cuvier, which is not uncommon; and it is also the only species which we have seen from the peninsula of India, unless a particularly large skin procured in Travancore and sent on loan by Mr. Elliot, may

* The following notes were taken of them; and we may here characterize the species as—

H. ELLIOTI, nobis. Entire length 26 in., of which the tail measures half: length of fore-limb, to end of claws, 3⅜ in.; and of hind-foot with claws 2½ in. General colour as in H. FUSCUS, Waterhouse, of the Nilgiris, but the pale portion of the annulated hairs whiter,—the four limbs blackish above,—and the tail (which is less bushy than in H. FUSCUS) tipped with black for the terminal 2½ or 3⅛ in. In this specimen there was an appearance of a collar, from the greater development of the blackish portion of the hairs and of the whitish portion lower down, in those forming a sort of nuchal ring. Another specimen had the general cast of colour redder,—a maronne-red prevailing, very bright on the four limbs above the black feet, and upon the tail where bordering on its black tip. HAB. S. India.

prove to be that of another. This specimen is remarkable for having the whole upper half of the head and body and of the basal moiety of the tail, covered only with the short and close downy fur common to the genus, with merely a very few scattered piles of the ordinary longer fur intermixed. The under half of the head and body and rest of the tail are clad as usual, precisely as in L. NAIR and similarly coloured; but what is remarkable, is the abrupt and well defined straight line of demarcation separating the upper and lower halves of the animal, and passing immediately below the ear-conch. We suspect, however, (in fact feel satisfied,) that the individual was killed while changing its coat; but its size is still remarkable, being equal to that of the common Bengal Otter (L. CHINENSIS, Gray, vel *tarayensis*, Hodgson, &c.). Nevertheless, we consider it identical with L. NAIR.

URSIDÆ. The Bear of Ceylon is the URSUS (vel PROCHILUS) LABIATUS of all India southward of the Himalaya, and which is peculiar to this country.

INSECTIVORA. SOREX is the only genus as yet ascertained; but the discovery of TUPAIA ELLIOTI, Waterhouse (*Proc. Zool. Soc.*, July 24th, 1849), in the eastern ghâts of peninsular India, renders it likely that this genus also may have its representative in Ceylon. Perhaps, also, the Hedgehog of the Nilgiris (ERINACEUS MICROPUS, nobis, *J. A. S.* XV, 170), or other species of this genus, may inhabit the island; the more especially as Dr. Kelaart remarks that there are two species of Hedgehog preserved in the Medical Officer's museum at Colombo, though whence brought is unknown. SOREX MURINUS, L. (apud Gray), the common Indian Musk Shrew, is mentioned both by Mr. Layard and Dr. Kelaart; and the latter gentleman has forwarded two mountain species for examination, both of which we consider to be new and undescribed.

S. MONTANUS, Kelaart, *n. s.* A typical SOREX, with dentition, &c., as in S. MURINUS. Total length 6 in., of which the tail measures 2¼ in.: hind-foot, minus claws, ⅝ in. Colour uniform dusky or dusky-slate, with the tips of the fur rufescent. Dr. Kelaart sent two specimens from Newera Elia, which, most decidedly, are of the same species; but one of these had a very powerful odour when fresh, and the other was inodorous.

S. (?) MACROPUS, nobis, *n. s.* General aspect of typical SOREX,

with colourless teeth and scattered long hairs on the tail; the ears scarcely visible beyond the fur; and the feet remarkably large. Length about 6½ in., of which the tail is 2¼ in.; hind-foot with claws nearly ⅞ in.; the fore-foot ¼ in. broad, with long and but slightly curved claws, that of the middle digit ¼ in. in length. Fur somewhat long and very soft, uniform blackish, very faintly tinged rufescent; the extreme tip of the tail dull white in the only specimen examined. Teeth small: the upper quasi-incisors shorter and less strongly hooked than in the typical SORICES, with the posterior spur large; the lower quasi-incisors serrated, shewing two depressions, and therefore a row of three coronal points. Behind the upper false incisors a series of four small præmolars precedes the *carnassiez*, the two medial being of equal size, the first rather large, and the fourth smaller; and below are the usual two (inclusive of the *carnassiez*), as in the genus generally. Accordingly, this species cannot be brought satisfactorily under any of the subdivisions of SOREX yet instituted; and its very large feet, more especially, indicate that it should form a particular subdivision. Both this and the preceding species are found at Newera Elia and to 1000 ft. below.*

In additon to S. MURINUS, S. MONTANUS, and S. MACROPUS in Ceylon, Dr. Kelaart writes that he has lately received two specimens of a large black Shrew double the size of the last, which he also considers to be distinct and probably undescribed.

* The Shrews have very anomalous dentition; and we consider their quasi-incisors above and below to be *modified præmolars*. The upper canines appear to be wanting throughout the order, and the lower canines when present are generally small, the first præmolar above and sometimes below being magnified to assume the form and fulfil the function of canines (vide XIX, p. 216). In the Shrews no intermaxillary bones have been traced at any age, and therefore the upper front teeth are decidedly not incisors, as they are generally termed: if canines, they would be an anomaly throughout the order; and extracted from the socket they have more the character of præmolars, exhibiting a second fang coalescent or imperfectly separated, (i. e. originally distinct, no doubt,) proceeding from the posterior spur or cusp. The lower front teeth have also two coalescent fangs, shewing a broad and deep median groove on the inner side, and a similar but less extended groove on the outer. Thus, at least, in S. MURINUS. It is not unlikely that in some of the other species (or subgeneric forms) the two fangs may be permanently separate.

RODENTIA. SCIURIDÆ. Of this family, Dr. Kelaart sends two species of Flying Squirrels. One is PTEROMYS ORAL, Tickell, found throughout the peninsula of India. The other is a magnificent SCIUROPTERUS, which possibly may be a fine adult of the species described as SC. FUSCOCAPILLUS, Jerdon, nobis, *J. A. S.* XVI, 867, from a younger and comparatively inferior specimen. We incline, however, to the opinion that it is distinct; and Dr. Kelaart terms it

SCIUROPTERUS LAYARDI, Kelaart. Nearly affined to SC. CANICEPS, Gray, of the S. E. Himalaya, from which it differs in having the fur of its under-parts of a dull non-fulvescent white, the parachute membrane being margined with pure white fur, lengthened and conspicuous at the angle. Face grey, except the forehead which is rufous-brown, like the rest of the upper-parts. A dusky spot on the nose. Whiskers long and black; and there is a tuft of long soft hairs below the ears, and a smaller tuft before them. The ear-conch is $\frac{3}{4}$ in. long posteriorly, ovate and somewhat narrow. Fur very dense, the basal three-fourths of the piles dusky, sinuous, and fine in texture; the tips coarser, and shining dull rufous-brown, forming the surface-colour. Tail flat and broad, above nigrescent, and below deeper blackish except at tip. Feet greyish, with a faint rufous tinge on the hind only. Length about 2 ft., of which the tail with hair measures half: hind-foot, from heel to tip of claws, $2\frac{1}{2}$ in.: fore-foot, to membrane, $1\frac{1}{2}$ in. HAB. Mountains of Ceylon (Dimboola).

The SCIURI of Ceylon are treated of in *J. A. S.* XVIII, 600 *et seq.*, where five species are enumerated, to which Dr. Kelaart has now added SC. TRILINEATUS, Waterhouse (v. *Delesserti*, Is. Geoffroy), identical with the race of the Nilgiris and Malabar. He has also favored the Society with a fine example of SC. TENNENTII, Layard, *loc. cit.*, perfectly similar to that sent by Mr. Layard; and with a young specimen of SC. MACROURUS, remarkable for having the terminal three-fourths of its tail unmixed white or slightly yellowish white. "The SC. MACROURUS," he remarks, "I have seen of various colours; some black: and I am inclined to think the SC. TENNENTII only a large variety of it. SC. MACROURUS even changes colour from brown to black." Mr. Layard, however, insists that "SC. MACROURUS, the common large Squirrel of our western coast, never intrudes on the haunts of SC. TENNENTII, nor is intermingled with it in its own loca-

lity." The two seem to hold, therefore, the same mutual relation as PRESBYTIS THERSITES and PR. PRIAMUS, or PR. URSINUS and PR. CEPHALOPTERUS.*

* The rufous-capped striped Squirrel noticed in a foot-note to *J. A. S.* XVIII, 602, Mr. Layard terms Sc. KELAARTI, Layard; but it does not appear sufficiently distinct from Sc. BRODIEI. According to Mr. Layard, "Sc. TRISTRIATUS is the common low country Squirrel" (of the island): "Sc. BRODIEI is common on the west coast from Point Pedro and Putlam; replacing Sc. TRISTRIATUS, from which it is easily distinguishable by its pale colour and the long pencil-tuft at the extremity of the tail,—this, however, is often wanting in stuffed specimens, and indeed even in live ones, the hair being but slightly attached to the skin: Sc. KELAARTI entirely replaces all the other small SCIURI from Tangalle and Hambantotte, and I should fancy extends round to Trincomali. It may be described as very like Sc. PALMARUM of India, but the head is much redder, the halves of the back and belly are more blended, and the animal is altogether smaller." These three little Squirrels, if different, are exceedingly affined; and all have the rufous colouring under the tail which is never seen in Sc. PALMARUM. It would be interesting to ascertain if their voices differ, for that of Sc. TRISTRIATUS is remarkably unlike the voice of Sc. PALMARUM.

In XVIII, 603, it is remarked that there are no SCIURI more difficult to understand than the group exemplified by Sc. MODESTUS, Müller, &c. The three Darjiling specimens there referred to, as having the thighs externally of a bright ferruginous colour, exemplify the Sc. LOKRIAH, Hodgson, apud Gray, who terms it the "Red-thighed Squirrel" (vide *Catal. Brit. Mus. Mammal.)*; and the Sc. LOKRIAH, H., apud nos *(J. A. S.* XVI, 873), Mr. Gray designates as Sc. SUBFLAVIVENTRIS, McClelland. In Dr. Cantor's list of the mammalia of the Malayan peninsula, Sc. MODESTUS, S. Müller, is cited as a doubtful synonyme of Sc. TENUIS, Horsfield, and the habitats given by Dr. Müller ("Java, Sumatra, Borneo, Canton,") are transferred; but Mr. G. Moxon has recently presented the Society with a specimen from Malacca, which we take to be the Malayan peninsula race referred to Sc. MODESTUS, and which is very distinct from Sc. TENUIS of Java, and apparently differs also from the Sc. MODESTUS figured by Dr. Solomon Müller. Length about 8 in., of tail 9 in., its hair reaching 2½ in. farther; hind-foot with claws 1¾ in. Colour of the upper parts grizzled black and golden-fulvous, deeply tinged with ferruginous on the croup and tail: under-parts pale ashy; and limbs grizzled ashy externally: whiskers long and black: terminal two-thirds of the tail banded with black, the alternating fulvous bars whitish towards the end: no ferruginous on the face, sides and limbs, as in Dr. S. Müller's figure of Sc. MODESTUS. From Sc. NIGROVITTATUS, it differs in having no lateral stripes, nor the rufous tinge about the muzzle and cheeks; also in the decided ferruginous tinge of its croup and tail, and the very distinct bands upon the latter. In the same collection were

MURIDÆ.—Of the Rat tribe, Dr. Kelaart has forwarded

1. GERBILLUS INDICUS, F. Cuvier; from which we now doubt whether *G. Cuvieri*, Waterhouse, and *G. Hardwickii*, Gray, differ constantly in any respect (vide *J. A. S.* XV, 138). At least, specimens are perfectly similar from different parts of Bengal, S. India, and Ceylon; but we have not yet examined the skull of a Cinghalese example. Dr. Kelaart remarks that Kandyan examples differ in no respect from the Gerbil of the plains of Ceylon.

2. GOLUNDA ELLIOTTI, Gray, *Mag. N. H.* 1837, p. 586: *Mus hirsutus*, Elliot; *M. coffæus*, Kelaart. "The Coffee Rat of Ceylon, a very destructive species, rooting up the coffee trees, and nearly destroying whole plantations in one night, when some plant on which they generally live is scarce in the jungle." (Kelaart.)

3. G. MELTADA, Gray, *ibid.*: *Mus lanuginosus*, Elliot; *M. newera*, Kelaart. We have little doubt about the correctness of the identification of this species, although there is no S. Indian specimen in the Society's museum to compare with it. In this type, as in GERBILLUS, the upper rodential tusks are distinctly grooved.

4. MUS BANDICOTA, Bechstein: *M. giganteus*, Hardwicke; *M. ikria*, Buch. Ham.; *M. nevorivagus*, Hodgson, &c. "Common in the paddy-fields round Cotta, doing great damage to the crops and embankments; the natives consider them very good-eating." (Layard).

(Mr. Layard has also procured M. INDICUS, Geoffroy, v. *Arvicola indica*, *A. bengalensis*, et *Mus kok*, Gray, *M. providens*, Elliot, and probably *M? pyctoris*, Hodgson, *Ann. Mag. N. H.* XV, 267, if not also *Nesokia Hardwickii*, Gray, *ibid.* X, 265. "Not uncommon about Jaffna. The natives esteem them great delicacies, and they are much sought after.")*

5. M. DECUMANUS, L.

(M. RATTUS, L. Included by Mr. Layard. In Calcutta, we have only obtained this species from the shipping, and may remark that there is a brown variety of it so much resembling the M. SETIFER,

three specimens of Sc. LATICAUDATUS, S. Müller, apud Cantor, which is doubtless the *Rhinosciurus tupaioides*, Gray, from Singapore, and possibly distinct from true LATICAUDATUS. One of these has been presented for the Society's museum.

* From a recent letter from Dr. Kelaart, he also appears to have met with this species at Kandy.

Horsfield,—an arboreal species which is very unlikely to be often conveyed about in ships,—that we cannot help strongly suspecting that the black and brownish specimens from Van Dieman's Land assigned to *M. setiger (setifer)* in Mr. J. E. Gray's catalogue of the mammalia in the British Museum, pertain really to the European Black Rat. Of this we have also fine examples from France).

6. M. NEMORALIS, nobis, *n. s. (M. setifer* apud Layard* ?) Very like M. SETIFER, Horsfield, but with a considerably longer tail, exceeding the head and body in length in the proportion of five to four.† The whiskers are also blacker, at least than in what we take to be a half-grown specimen of M. SETIFER from Malacca. Dr. Kelaart sent an adult specimen and one two-thirds grown from Ceylon; and Mr. Frith lately obtained three young living examples from a huge nest placed among the branches of a dense mango tree, in the vicinity of Calcutta. Two of these soon after made their escape, and the third we possess in spirit. We have since ascertained its occurrence in the Botanic garden, and other likely sites in the neighbourhood of Calcutta; so that we hope soon to procure some recent examples, from which a proper description may be taken.‡

7. M. RUFESCENS, Gray: *M. flavescens et M. rufus*, Elliot (nec Waterhouse); *M. arboreus*, B. Hamilton, MS. This also is a tree Rat, keeping especially to the cocoa-nut palms, though by no means confined to them. According to Buchanan Hamilton, it nestles in the cavities of trees, and not (like the preceding species) among the branches. We have obtained a single individual variety, in which the white belly is much less abruptly defined than usual. One that escaped in our private residence took up his abode for some days (till we saw no more of him) on the top of a glass folding-door, not burrowing like the com-

* Probably not, however, as Mr. Layard's supposed *M. setifer* was "procured *in a paddy field* near Galle."

† In M. SETIFER, the tail is shorter than the head and body.

‡ An adult procured since this was written was unfortunately carried off by a Kite. We had not the opportunity of actually comparing it with the Ceylon specimens, but it certainly appeared to be specifically identical with them; the belly being merely somewhat albescent. It exhibited a manifest affinity for M. RUFESCENS, but was much larger, less rufescent, and the belly dull whitish instead of pure white. Shot on the bough of a tree.

mon house Rat. They do, however, as Buchanan Hamilton remarks, visit out-houses and similar places by night; but pass the day on trees, chiefly cocoa-nuts (being very destructive to the young fruit), and bamboos.

8. (?) M. KANDIANUS, Kelaart, *n. s.* Very like the preceding species, but the fur softer and of finer texture, and less rufescent in colour. Whiskers very long, fine, and black. Peculiar to the mountains, and we strongly suspect it to be only a mountain variety of M. RUFESCENS; but require to examine more perfect specimens, and to compare the crania and dentition, before coming to a final decision. M. NIVIVENTER, Hodgson, would seem to be affined.

Other species of MUS are enumerated by Dr. Kelaart, as inhabitants of Ceylon; but they require further examination.

HYSTRICIDÆ. A young Cinghalese Porcupine sent alive by Mr. Layard, and since mounted in the Society's museum, is evidently of a new species, most nearly affined to the common but undescribed Porcupine of Bengal. The last and most satisfactory authority upon the species of Porcupine is Mr. Waterhouse's 'Natural History of the Mammalia,' Vol. 2. This author reduces the known species of HYSTRIX as now limited (including *Acanthion*, F. Cuv.,) to four; viz. two crested species of large size, the European and N. African H. CRISTATA, L., and the Asiatic H. HIRSUTIROSTRIS, Brandt (v. *leucura*, Sykes); and two crestless species of much smaller size, the sub-Himalayan H. HODGSONII, Gray (v. *alophus*, Hodgson), and H. LONGICAUDA, Marsden (v. *Acanthion javanicum*, F. Cuv.), of the Malayan peninsula and archipelago. Of these, the Society's museum contains two skulls, a stuffed head, ditto very young animal, and a flat skin (deprived of the crest) of a half-grown example, of H. HIRSUTIROSTRIS; flat skins of old and young of H. HODGSONII; and a stuffed specimen of H. LONGICAUDA: also three skulls (one of them from Asám), agreeing with Mr. Waterhouse's description and figures of the skull of H. HODGSONII; but on two of them the names "*Hystrix cristata*" and "Crested Porcupine" are written by one of our predecessors, so that they perhaps belong to the small crested species of Bengal, and not to the sub-Himalayan crestless Porcupine.* No. 1 is that of an old animal,

* In Mr. Walker's list of the mammalia of Asám (*Calc. Journ. Nat. Hist.* III, 267), the only Porcupine mentioned is H. CRISTATA, which should at least indicate the existence of one of the crested species in that province.

and is rather larger than the two described by Mr. Waterhouse; measuring 5¼ in. in total length: No. 2 (from Asám) is 5 in. long: and No. 3 is that of a young animal, in which the naso-frontal sutures form each a straight line, meeting its opposite at an obtuse angle posteriorly; this, however, is merely due to immaturity, the forehead not having commenced to bulge as in the adult animal. H. HODGSONII and H. LONGICAUDA are nearly affined species, but exhibit well marked distinctions in the cranium: and externally they are most readily characterized apart by the latter having a strongly marked white demi-collar, proceeding upward from the throat, which either does not occur or is barely indicated in the other, and by its body spines (*i. e.* spinous bristles, as distinct from the quills,) terminating in sharp and rigid points, not flexible and setaceous tips as in H. HODGSONII.

The common Bengal Porcupine (and of Asám?, Sylhet, and Arakan, rare near Calcutta),—H. BENGALENSIS, nobis,—resembles the two last mentioned in size and general character;* and like them it does not possess the two great lateral masses of very long, slender and flexible quills, impending and concealing the much shorter, thick, rigid and acutely pointed quills which constitute the armature of the animal: but it has only a very few long and slender quills, gradually thickening in the basal half and attenuating much in the terminal half, intermixed with the ordinary or weapon-quills towards the front and at the sides. The latter are much longer and thicker than in the two crestless species; and the body-spines are still flatter and more strongly grooved, and terminate towards the neck in slight setæ, towards the quills in rigid points. There is a distinct but small thin crest, (not dense and *massive*, as in the two large species,) the longest bristles of which measure 5 or 6 in., and are tipped with white for the terminal third: and the white demi-collar is as strongly marked as in H. LONGICAUDA. General colour as in H. HODGSONII; the quills generally having the basal half white, the rest black, most of them with a white tip more or less developed: the few long and flexible

* Or it may attain to a larger size, though not nearly to the magnitude of H. CRISTATA and H. HIRSUTIROSTRIS. Since the above descriptions were written, we have seen, in the Barrackpore menagerie, fine living examples of H. HIRSUTIROSTRIS, H. BENGALENSIS, and the ATHERURA inhabiting the Tippera and Khásya hills, which latter is well figured and described by Buchanan Hamilton.

quills are white, with a narrow black band about the centre. Tail as in the two crestless species, with similar pedunculated quills.

The Cinghalese Porcupine sent by Mr. Layard, though young, we do not hesitate to name as another distinct species—H. ZEYLONENSIS, nobis. Fortunately, we have a stuffed Bengal Porcupine of about the same size and apparent age to compare with it. It is nearly affined to H. BENGALENSIS, with a similar but more developed crest of long bristles; these are of the same brown colour as the body spines, and have each one obscure pale annulation and beyond it a white annulation at less than two-thirds of its length: the quills are slenderer than in the Porcupine of Bengal, and are black, with white extreme base; mingled with others longer and more slender, which are chiefly very pure white, often with dark base. Spines much flattened and grooved, and very much coarser over the limbs than in H. BENGALENSIS; the anterior terminating in very slight flexible setæ, becoming gradually obsolete towards the quills. Upon the hind-limbs especially, the spines are quite as coarse as on the sides of the body; whereas in the Bengal Porcupine they are there much finer and more bristle-like. White demi-collar barely indicated. The general colour is much as in the others, but a little more rufescent, and the spines are even more shining than usual; the white of the quills being also much purer than in either of its congeners. The body-colour pales remarkably on the hind-limbs. The ear-conch is formed most as in H. HIRSUTIROSTRIS, being somewhat squared above, with strongly marked posterior angle; and (in the specimen at least) they are much more scantily clad with hair than in H. BENGALENSIS and H. HODGSONII. Lastly, the pedunculated quills of the tail are considerably more elongated than in either of the other species. In the small well mounted specimen described, standing $5\frac{1}{2}$ in. high at the shoulder, some of the bristles forming the crest are 6 in. long: in a Bengal Porcupine of the same size, they are not $3\frac{1}{2}$ in.; but still appear conspicuously in the latter, from being all broadly and evenly tipped with white. It is not improbable that the large H. HIRSUTIROSTRIS may likewise prove to inhabit the same island; and likely enough there is a second and small species, perhaps H. ZEYLONENSIS, in S. India. The latter is described by Mr. Layard to be common in the Chilaw and Jaffna districts, doing great damage to the cocoa-nut trees when young and tender. The natives term them *Oat Oara* ('thorn pig').

The skulls of H. BENGALENSIS and H. ZEYLONENSIS remain to be examined and compared with those of H. HODGSONII and H. LONGICAUDA; for to the latter, and not to the two great Porcupines, these two small crested species are more immediately affined. The want of crest is accordingly no distinction of ACANTHION from HYSTRIX, as Mr. Gray would separate them; but the absence of the two great lateral masses of very long slender quills, impending the others and even the tail in the two large species, affords a better external distinction. We follow Mr. Waterhouse and others, however, in assigning the whole to *Hystrix*, as now limited.

LEPORIDÆ. The Hare of Ceylon is LEPUS NIGRICOLLIS, F. Cuv. (*L. melanauchen*, Tem.), identical with the species of peninsular India, Java, and the Mauritius, from each of which regions the Society possesses a specimen.*

* The Hare of Bengal and all Upper India is L. RUFICAUDATUS, Is. Geoffroy; Mr. Waterhouse erroneously supposing L. NIGRICOLLIS, F. Cuv., to be the Hare of Bengal. We know but of twelve species of *RODENTIA* in all Lower Bengal, which are as follow:—1. SCIURUS PALMARUM.—2. GERBILLUS INDICUS:—3. MUS INDICUS, Geoffroy (*M. kok*, Gray); common field Rat.—4. M. TERRICOLOR, nobis; common field and garden Mouse.—5. M. BANDICOTA, in marshy localities.—6. M. DECUMANUS.—7. M. RATTUS, observed only among the shipping in the river.—8. M. FLAVESCENS, chiefly in cocoa-nut trees and about bamboos.—9. M. NEMORALIS, trees.—10. M. MANEI, Gray; domestic Mouse.—11. HYSTRIX BENGALENSIS.—12. LEPUS RUFICAUDATUS.

We suspect that MUS OLERACEUS, Sykes, is also a Bengal animal; and the Society possesses a specimen from Asám quite similar to others from S. India. M. DUMETICOLA and M. POVENSIS, Hodgson, require to be carefully compared with it.

M. TERRICOLOR, nobis, must be closely affined to M. CERVICOLOR and M. STROPHIATUS, Hodgson. Mr. Elliot sent it from S. India together with M. LEPIDUS, from which he did not distinguish it. Indeed it much resembles that species in form and colour, but the face is very much shorter, and the fur short, soft, and not spinous in the least degree. Its colour varies, however, according to the soil; those of the alluvium of the Ganges being darker than specimens from the ferruginous soil to the westward. All have the under-parts white, abruptly separated from the hue of the upper-parts, as in the various affined species. Length 2½ in.; of tail 2⅛ in.; ears ½ in.; hind-foot $\frac{9}{10}$ in. Inhabits gardens, and is very numerous in the open fields; together with GERBILLUS INDICUS and MUS INDICUS.

M. MANEI, Gray, who refers to this the *M. musculus* apud Elliot, is consequently the common house Mouse of India generally, which differs from M. MUSCULUS in having a longer tail, and shorter fur which is not so dark in colour.

PACHYDERMATA. The Pachyderms of Ceylon are the Elephant, the wild Hog, and the Duyong; which last, according to Mr. Layard, is common in the Bay of Calpentya, on the western coast, and bears the name of *Talla Maha* among the natives, who highly esteem its flesh. A skull of a Cinghalese wild Boar, sent by Mr. Layard, differs much in contour from skulls of the wild Boar of India; indeed so much, that we feel justified in denominating it as a peculiar species—

SUS ZEYLONENSIS, nobis, *n. s.* Skull longer than that of the Indian Boar, nearly straight in profile, very much contracted at the vertex.* Palate contracting posteriorly to less than 1 in., from the magnitude of the last molar, which is considerably larger in both jaws than in

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Length of head and body 3 in., and of tail 3½ in. M. DUBIUS, M. HOMOURUS, and M. URBANUS, Hodgson, require to be compared with it.

Here, too, may be indicated a remarkable species from Mergui (of which we possess an imperfect specimen) by the name M. BERDMOREI. Length about a foot, of which the tail is not quite half. Ears posteriorly ⅝ in. Hind-foot 1⅝ in. Fur shortish, even, coarse and hispid, but not spinous, of one quality, with no long hairs intermixed: its colour grizzled grey above, unmixed with rufous; below and on the feet pure white. Rodential tusks white. Tail rather more copiously clad than usual with short hairs.

* There are two races, if not even species, of Indian Wild Boars, distinguished respectively by a broad and by a narrow vertex in specimens *of the same age*. In the former, the vertex, where narrowest, measures 2¼ in. wide; in the other barely 1⅞ in. In other respects they are similar, except that the molars are larger in the race with narrow vertex. This, so far as we have seen, is the Bengal animal; whereas that with broad vertex inhabits Kutak, and perhaps the Indian peninsula generally. A skull from Arakan exhibits an intermediate character, with vertex 1¾ in. wide, and the molars large. The Bengal Boar has long borne a reputation for higher courage than that of the Upper Provinces at least, which may depend upon its specifical distinctness. While so many affined species of Sus have been distinguished by the Dutch zoologists in the archipelago, it is not unlikely that a plurality of continental species may have remained undetected.

In Dr. Solomon Müller's figures of the skull of SUS VERRUCOSUS, the young but full grown animal is represented to have a broad vertical plane, which is excessively contracted in an old animal: but the oldest Indian skull of several now before us is one with the broad vertical plane.

Since writing the above, we find that Mr. Gray distinguishes a Boar skull from the Nilgiris by the name SUS AFFINIS; while specimens from the Nepal "hills" and *Tarai*, and one from Malabar, he designates SUS INDICUS. *List of the Osteological specimens in the collection of the British Museum.*

the wild Boar of India, the upper measuring $1\frac{3}{4}$ in. long, by $\frac{15}{16}$ in. broad anteriorly. Vertex narrowing to 1 in. only in breadth. Total length of skull, from vertex to tips of nasals, $16\frac{1}{4}$ in. Altogether, this skull approximates closely in contour to the figures of the skull of Sus BARBATUS by Dr. S. Müller and M. Temminck.

RUMINANTIA. CERVIDÆ. The "Elk" of Ceylon appears to be RUSA HIPPELAPHUS of India generally, vel *Cervus equinus*, F. Cuv., of the Malayan peninsula, Sumatra, and Borneo; found also in the intervening Burmese countries. AXIS MACULATUS is common: also MUNTJACUS VAGINALIS, of which the heads of both sexes were sent for identification by Dr. Kelaart. MEMINNA INDICA abounds*. Lastly, Dr. Kelaart informs us of the existence of a species affined to AXIS PORCINUS, and probably undescribed; living examples of which he has recently shipped for the London zoological gardens.†

* "The *Moschidæ*," writes Mr. H. N. Turner, jun. (*Ann. Mag. N. H.*, 2d series, VI, 482) "must, of course, be distinguished from the *Cervidæ* by their trilocular stomach, and by the presence of the gall bladder." We have never found the latter to exist, however, in the Chevrotains.

† These, we now learn, have arrived in London, and are considered to be distinct and new. We are also informed that the (so called) Hog Deer of the banks of the Indus (C. DODUR? Royle,) is distinct from the AXIS PORCINUS of Bengal, Nepal, Asám, Arakan, Tenasserim, &c.—While on the subject of Deer, it may be remarked that Mr. Gray, in his 'List of osteological specimens in the collection of the British Museum,' gives as distinct species of the Elaphine group "CERVUS CASHMIRENSIS, Falconer, MS.," and "CERVUS (WALLICHII?) AFFINIS" of Mr. Hodgson. We have little doubt that these will prove to be the same, and refer to figs. 8 and 9 of the plate accompanying *J. A. S.* X, 750, representing a horn of the Kashmir Stag, for comparison with Mr. Hodgson's various figures of those of C. AFFINIS (*J. A. S.* X, 722, XIX, 466,519). We continue to be, as formerly, of opinion that the species is CERVUS WALLICHII, Duvaucel, figured and described from a young animal at that time living in the Calcutta Botanic Garden, the identical pair of horns it bore being now in the Society's museum, and represented *J. A. S.* X, 750, pl., fig. 7. In all probability, it is also the *Irbisch*, or great Stag of Siberia, mentioned by Strahlenberg; if not likewise the Persian *Maral*, which we saw alive in London; and (as remarked on a former occasion, *J. A. S.* X, 747,) we "cannot doubt that, with full maturity, this noble species possesses a terminal crown to its antlers, assuming thus every feature of a typical member of the elaphine group;" the crown being, however, probably as in the Wapiti (C. CANADENSIS, vide X, 750, pl., figs. 4, 6), rather than as typically in the European Stag (C. ELAPHUS). The C. WALLICHII, as figured by Mons. F. Cuvier, most close-

BOVIDÆ. The wild Buffalo is common; and it would seem that formerly Bos GAURUS inhabited the island, inasmuch as the *Guavera* of Knox can scarcely refer to aught else; but, if so, it has now been exterminated for nearly a century.

EDENTATA. Mr. Layard writes—"I think our island MANIS is identical with the Indian M. BRACHYURA, but it requires identification. It is not uncommon. I have also seen another species which I have little doubt will prove to be the long-tailed Pangolin of authors;" or can this be M. LEPTURA, nobis, *J. A. S.* XI, 454, XVI, 1293?

CETACEA. The Dolphins and Porpoises of the coast, and the large Whales occasionally stranded, are all in need of accurate determination.

AVES.

Of Birds, Dr. Kelaart sent the following species worthy of remark:—

PALÆORNIS CALTHRAPÆ, Layard, Blyth, *J. A. S.* XVIII, 800, XIX, 334. "Common at Newera Elia and lower down" (Kelaart).

SCOPS ALDROVANDI, rufous variety (*Sc. sunia*, Hodgson). Most probably this is the *Strix indica* vel *bakkamæna*, auct., from Ceylon.*

SPIZAËTUS NIPALENSIS, Hodgson. Peculiar, so far as previously observed, to the Himalaya.

HARPACTES FASCIATUS, (Pennant); *Trogon malabaricus*, Gould.

CAPRIMULGUS KELAARTI, nobis, *n. s.* Both sexes of a species much resembling C. INDICUS, Latham, but smaller, and identical with the Nilgiri bird described in a note to *J. A. S.* XIV, 208: and the large specimen referred to on the same occasion, which we have now much reason to believe was either from the Philippines or China,† is doubtless also of a distinct race; the three differing much as C. ALBONOTATUS, C. MACROURUS, and C. ATRIPENNIS, or C. RUFICOLLIS and C. INDICUS, C. MONTICOLUS and C. AFFINIS. These three

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ly resembles the Wapiti Stag of N. America; and the similitude of the horns (at least at a particular age?) is exhibited in figs. 2 and 8 of the plate referred to. Compare also the young WALLICHII, fig. 7, with the young *Maral*, fig. 10.—Since the foregoing was in type, we have chanced to refer to the figure of the Wapiti in Dekay's volume on the Mammalia of the State of New York, and the horns represented in that figure are absolutely similar to those of the great Asiatic Stag, as the latter are given by Mr. Hodgson.

* The name *Bakka meena* is applied to the *Caprimulgi*.

† It formed part of the dispersed Macao museum.

species or races much resemble C. EUROPÆUS in their general aspect, but have plumed tarsi, and the males are marked with white on *four* of the outer tail-feathers on each side, and on the same number of the wing-primaries. The white on the tail-feathers is not quite terminal, as in C. EUROPÆUS, but has a narrow dark margin in C. INDICUS and C. KELAARTI, and a much broader dark margin in the other, reducing the space occupied by the white in the first two races: and the *ensemble* of the markings of C. KELAARTI presents a certain difference from that of C. INDICUS, readily enough appreciable by the eye, but which can scarcely be expressed adequately in language; further than that the pale portion of the plumage generally is more albescent and less tinged with rufous in C. KELAARTI, and thus contrasts more strongly with the black. The size, however, affords the readiest distinction; the length of wing in three specimens of C. KELAARTI ranging from $6\frac{7}{8}$ to $7\frac{1}{8}$ in., in five of C. INDICUS from $7\frac{5}{8}$ to $7\frac{7}{8}$ in., and in one of the Chinese (?) race $8\frac{1}{2}$ in.*

CYPSELUS MELBA, (L.) Inhabits also the N. W. Himalaya, Central and S. India.

CISSA PUELLA, nobis, *J. A. S.* XVIII, 810; *C. pyrrhocyanea*, (Wagler), Gould's 'Birds of Asia,' pt. 1. "This," writes Dr. Kelaart, "is perhaps the handsomest bird in Ceylon. It is rather numerous about Newera Elia, but I have not seen it in the low country."

GARRULAX CINEREIFRONS, Kelaart, *n. s.* Affined to G. DELESSERTI, (Jerdon, *Ill. Ind. Orn.* pl. 13), of the Nilgiris, but differing much in its colouring. General hue a rich brown above, much paler below; forehead and cheeks pure ashy; chin and borders of the outer primaries, albescent. Bill blackish. Legs dusky corneous. Length $8\frac{1}{2}$ in.; of wing $4\frac{1}{2}$ in.; and tail 4 in., its outermost feathers $1\frac{1}{8}$ in. less: bill to gape $1\frac{1}{4}$ in.: tarse $1\frac{1}{4}$ in.

ALCIPPE NIGRIFRONS, nobis, *J. A. S.* XVIII, 815. Young, similar in plumage to the adult.

CISTICOLA OMALURA, nobis, *Catal.* No. 822. Differs from C. CURSITANS, (Franklin), in having a stouter bill, the whole upper-parts much darker, and the tail sub-even, except that its outermost feathers

* Among numerous examples of C. INDICUS procured in Bengal and various other parts of India, the Malayan peninsula, &c., we have observed no difference worthy of notice here.

are ¼ in. shorter than the next. The prevailing hue of the upper-parts is dusky-black, with much narrower rufescent lateral margins to the feathers than in C. CURSITANS, the rump however being unmixed rufescent as in that species, and the neck much tinged with the same. One specimen has some dark markings on the breast; and another in first plumage greatly resembles the adults, and is conspicuously different from the young of C. CURSITANS. This species was long ago procured by Mr. Layard, and therefore is probably not peculiar to the mountains or their vicinity. From the whole of India we have only seen C. CURSITANS, which likewise inhabits Ceylon. Numerous African species of this genus have however been figured and described by Dr. Rüppell and Dr. Andrew Smith, and five Australian species by Mr. Gould (whose C. RUFICEPS we take to be merely the young of his C. ISURA). From DRYMOICA they differ structurally in having twelve tail-feathers instead of ten only.

MERULA WARDII, Jerdon. Both sexes of this species are sent, the female being the *Oreocincla micropus* of Mr. Hodgson.

M. KINNISII, Kelaart, *n. s.* The Blackbird of Newera Elia. Female, above ashy-black, below rather paler; bill and feet bright yellow. Length about 9 in., of wing 4½ in., and tail 4 in.; bill to gape 1⅛ in.; and tarse the same. 1st short primary 1¼ in. shorter, and 2d ½ in. shorter, than the 4th. The last character distinguishes this species readily from M. SIMILLIMA and M. NIGROPILEUS of S. India; as also from M. BRACHYPUS, nobis (*J. A. S.* XVI, 148), likewise of S. India, but which appears to be Latham's 'Black-crowned Thrush,' from Ceylon. The wings are even more rounded than in M. VULGARIS; and the species would seem to be closely affined to M. XANTHOSCELIS, (Jardine, *Contrib. Orn.*, 1848,) from Tobago. "The male," writes Dr. Kelaart, "is blacker and more glossy. In notes and habits resembling M. VULGARIS."

PRATINCOLA ATRATA, Kelaart, *n. s.* The 'Robin' of Newera Elia. Both sexes similar to those of PR. CAPRATA, except that they are much larger, with a proportionally rather stouter bill; and the female is much less rufescent. Wing 3¼ in. in the male; 3 in. in the female. "Notes and habits very like those of the English Robin" (Kelaart). PR. CAPRATA inhabits the less elevated parts of the island.

HIRUNDO DOMICOLA, Jerdon; *H. javanica* apud Latham and Shaw. 'Bungalow Swallow' of residents in the Nilgiris.

CORYDALLA STRIOLATA, nobis, *J. A. S.* XVI, 435.

MUNIA PECTORALIS, (? Jerdon), adult. This species was once only obtained by Mr. Jerdon in S. India, and his specimen (which is in the Society's museum) would now seem to be a young bird. What appears to be the adult is brown above, with pale stems to the feathers, nearly obsolete on the back; and passing to blackish on the forehead, wings, rump, and tail: throat and fore-neck, with the cheeks, deep brown-black: the smaller upper tail-coverts are variegated with white, and the longer are largely tipped with fulvous: under-parts variegated; the breast brown, and belly and lower tail-coverts black, the last having white medial streaks, and the rest of the under-parts white subterminal bands, and the flank-feathers a second and some of them a third white cross-band additionally. Beak livid bluish; and feet dark plumbeous. Length of wing $2\frac{3}{16}$ in.; tail $1\frac{3}{4}$ in.; beak from frontal angle $\frac{9}{16}$ in.

PYCNONOTUS PENICILLATUS, Kelaart, *n. s.*: *Yellow-eared Bulbul* (?), Jerdon, *Madras Journ.* XIII, 168. Bright olive-green above, yellow below: crown and cheeks black, passing to pure ashy on the ear-coverts; the chin, feathers at the angle of the lower mandible, and somewhat elongated loral tuft pointing upwards, white; above the eye, also, a white spot, and below it a yellow one,—and proceeding backward from the eye, above, is a lengthened tuft of bright yellow, silky, pointed feathers: no white marks on the tail. Bill black; and feet blackish. Length about 7 in., of wing $3\frac{1}{4}$ in., and tail 3 in.; bill to gape $\frac{13}{16}$ in.; and tarse $\frac{7}{8}$ in. Peculiar to the mountain region.

BRACHYPTERYX (?) PALLISERI, Kelaart, *n. s.* Female? A rich dark olive or somewhat tawny brown above, paler below, and whitish along the middle of the abdomen; flanks and lower tail-coverts dark; and a strong rufous tinge on the chin and throat. Bill dusky above, whitish beneath. Feet brown. Length about $6\frac{1}{2}$ in., of wing $2\frac{1}{2}$ in., and tail $2\frac{3}{4}$ in.: bill to gape $\frac{13}{16}$ in.; tarse 1 in. The 5th, 6th, and 7th primaries equal and longest, the 1st 1 in. shorter; and the outermost tail-feather $1\frac{3}{8}$ in. shorter than the middle ones.

PALUMBUS ELPHINSTONEI (?, Sykes), var.? This bird is so closely affined to the Nilgiri race, that we do not venture to separate it, however strongly distinguished in its colouring; quite as much so, for

instance, as TURTUR RISORIUS *(ferus)*, T. VINACEUS, and T. BITORQUATUS, or T. ORIENTALIS and T. AURITUS. It differs from the Nilgiri race in having the back and wings plain dark slaty, without a trace of ruddy margining to the feathers; the head, neck, and underparts are also tinged with vinaceous more than with green, and the reddish-purple gloss—especially about the lower part of the neck behind, where it contrasts *abruptly* with the ashy of the back,—is considerably more brilliant. It is altogether a handsomer bird than that of the Nilgiris. "The habits of this Pigeon," writes Dr. Kelaart, "are strictly arboreal; it flies high and swiftly. It comes to Newera Elia to breed; and I have seen a nest with only one egg, as large as that of the domestic Pigeon. The stomach contained fruits of the *Nelon*" (?) "Sexes nearly alike."

Dr. Kelaart further writes, from Newera Elia—"Among other birds, I have found here the COLLOCALIA BREVIROSTRIS" (sent), CUCULUS MICROPTERUS, GALLUS STANLEYI, GALLOPERDIX ZEYLONENSIS, ATHENE CASTANOTUS, and PERICROCOTUS FLAMMEUS, &c.; a little lower down, the GRACULA PTILOGENYS and GR. RELIGIOSA; and about 1000 ft. below Newera Elia, the HYPSIPETES NILGIRIENSIS."

The following species of birds are peculiar (so far as at present known) to the island of Ceylon.

PALÆORNIS CALTHRAPÆ, Layard, *J. A. S.* XVIII, 800, XIX, 334.

LORICULUS ASIATICUS, (Latham), *J. A. S.* XVIII, 801.

BUCEROS VIOLACEUS, Wagler *(non vidimus)*, *J. A. S.* XVIII, 803.

PICUS GYMNOPTHALMOS, nobis, *J. A. S.* XVIII, 804.

BRACHYPTERNUS CEYLONUS, (Forster).

BR. (?) RUBESCENS, Vieillot *(non vidimus)*.

MEGALAIMA FLAVIFRONS, (Cuvier).

M. RUBRICAPILLA, (Gmelin).

CENTROPUS CHLORORHYNCHOS, nobis, *J. A. S.* XVIII, 805.

PHŒNICOPHAUS PYRRHOCEPHALUS, (Forster).

BATRACHOSTOMUS MONILIGER, Layard, nobis, *J. A. S.* XVIII, 806.

CISSA PUELLA, nobis, *J. A. S.* XVIII, 810.

GRACULA PTILOGENYS, nobis, *J. A. S.* XV, 285.

GARRULAX CINEREIFRONS, nobis, *ante*.

MALACOCERCUS STRIATUS, Sw.; if really distinct from M. BENGALENSIS, (Brisson).

M. RUFESCENS, nobis, *J. A. S.* XVI, 453.

DRYMOICA VALIDA; *Dr. robusta*,* nobis, *J. A. S.* XVIII, 812.

CISTICOLA OMALURA, nobis, *ante*.

POMATORHINUS MELANURUS, nobis, *J. A. S.* XVI, 451.

ALCIPPE NIGRIFRONS, nobis, *J. A. S.* XVIII, 815.

DRYMOCATAPHUS FUSCOCAPILLUS, nobis, *ibid.*

OREOCINCLA SPILOPTERA, nobis, *J. A. S.* XVI, 142.

MERULA KINNISII, Kelaart, nobis, *ante*.

PRATINCOLA ATRATA, Kelaart, nobis, *ante*.

BRACHYPTERYX (?) PALLISERI, Kelaart, nobis, *ante*.

HIRUNDO HYPERYTHRA, Layard, nobis, *J. A. S.* XVIII, 814.

TEPHRODORNIS AFFINIS, nobis, *J. A. S.* XVI, 473.

DICRURUS EDOLIFORMIS, nobis, *J. A. S.* XV, 297.

D. LEUCOPYGIALIS, nobis, *J. A. S.* XV, 298.

PYCNONOTUS PENICILLATUS, Kelaart, nobis, *ante*.

P. NIGRICAPILLUS, (Drapiez).†

* Pre-occupied by another species described by Dr. Rüppell. Again, MALURUS GRACILIS, Rüppell, *Atlas*, is a DRYMOICA very closely affined to, if not identical with, our DR. LEPIDA, *J. A. S.* XIII, 376, XVI, 460. The name PRINIA GRACILIS, Franklin, subsequently bestowed to MALURUS GRACILIS, Rüppell, will nevertheless stand, as this refers to a true PRINIA as distinguished from DRYMOICA. PRINIA RUFIFRONS, Franklin, on the other hand, is a DRYMOICA; and the specific name claims precedence over PR. RUFIFRONS, Rüppell, *Neue Wirbel.*, which is another DRYMOICA, and may now bear the name of DR. RÜPPELLI, nobis. Of ten Arabian and N. African species at present assigned to DRYMOICA by Dr. Rüppell, those named by him CLAMANS, GRACILIS, RUFIFRONS, MYSTACEA, and ROBUSTA are true DRYMOICÆ,—PULCHELLA is a PRINIA,—and LUGUBRIS, ERYTHROGENIS, and seemingly INQUIETA and RUFICEPS, are CISTICOLÆ. The species of the last named group have constantly twelve *rectrices*, whereas those of the two former have but ten. Another Indian type, MALACOCERCUS, is represented in N. Africa by the MALURUS ACACIÆ, M. SQUAMICEPS, and CRATEROPUS RUBIGINOSUS, of Rüppell, and in S. Africa by CR. JARDINII, A. Smith. The CR. LEUCOCEPHALUS, CR. LEUCOPYGIUS, and CR. PLEBEIUS, Rüppell, appertain to a distinct African type which is unknown in India.

† *Sylvia nigricapilla*, Drapiez, v. *Ægithina atricapilla*, Vieillot, founded on Levaillant, *Ois. d'Afr.*, pl. 140; *Rubigula aberrans*, nobis, *J. A. S.* XV, 287, XVI, 472. Vieillot's name has the priority, but his *Muscicapa atricapilla* refers

TRERON POMPADORA, (Latham). *Non vidimus.* In need of identification, and supposed by Mr. Strickland to be the same as *Tr. malabarica*, Jerdon.

GALLUS STANLEYI, Gray: *G. Lafayettei*, Lesson; *G. lineatus*, nobis.

GALLOPERDIX ZEYLONENSIS, (Gmelin): *Tetrao bicalcaratus*, Pennant.

Others are doubtfully distinct, as MEGALAIMA ZEYLANICA from M. CANICEPS of S. India;* LEUCOCERCA COMPRESSIROSTRIS (*J. A. S.* XVIII, 815,) from L. ALBOFRONTATA; and we might here have placed MALACOCERCUS STRIATUS as doubtfully distinct from M. BENGALENSIS, DICRURUS LEUCOPYGIALIS from D. CÆRULESCENS, and POMATORHINUS MELANURA from P. HORSFIELDI: CORVUS SPLENDENS and ACRIDOTHERES TRISTIS are of a much darker hue in Ceylon than in Bengal and in N. India; so is MICROPTERNUS GULARIS of Ceylon as compared with the bird of S. India. HYPSIPETES NILGIRIENSIS is, on the contrary, paler in Ceylon, and more like the Himalayan H. PSAROIDES. ACROCEPHALUS DUMETORUM (XVIII, 815,) has, in Ceylon, a distinguishing greenish shade. The difference of PALUMBUS ELPHINSTONII of Ceylon from that of the Nilgiris has already been indicated: and, lastly, ORIOLUS MELANOCEPHALUS of Malabar and Ceylon may constantly be distinguished from that of Bengal, Nepal, Asám, &c., by the markings of the wings, as especially the quantity of yellow at the tips of the tertiaries; this being much more developed in the Bengal race, in which it occupies the whole outer web of the shorter first and second tertiaries, and about $\frac{3}{4}$ in. of the outer webs of the two next; whereas in the Ceylon and Malabar race it forms merely a series of small terminal spot to the tertiaries: the yellow tips of the coverts of the primaries are also constantly reduced in size in O. MELANOCEPHALUS of Malabar and Ceylon.

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to another species of the same genus, which is *Hæmatornis chrysorrhoides*, Lafresnaye (*Rev. Zool.* &c., 1845, p. 367), a Chinese species, different from *P. hæmorrhous*, (Gm.), with which Dr. Hartlaub supposed it identical in *Rev. Zool.* &c., 1846, p. 4. For description of P. ATRICAPILLUS, (Vieillot), vide *J. A. S.* XIV, note to p. 569.

* M. CANICEPS of Central and N. W. India is constantly larger, with the throat less dark in colour.

Note.—Since the foregoing sheets were sent to press, we have received from Dr. Kelaart, a printed "Catalogue of Ceylon Mammalia, with descriptions of new species," recently published in the 'Journal of the Royal Asiatic Society of Ceylon.' This will necessitate a few changes of nomenclature.

Presbytis ursinus, nobis (p. 155), he designates as Pr. cephalopterus, var. b, *monticolus;* and the native name he spells *Kalloo Wanderoo*,—that of Pr. thersites he now gives as *Ellee Wanderoo*,—and of Pr. priamus as *Kondé Wanderoo*. He further mentions *(in epistolâ)* another mountain race, by the name Pr. albinus, Kelaart, *n. s.* "All white, with a dash of grey on the head; face and ears black; palms and soles flesh-coloured. Rare: seen about Kandy in parties of three or four. We have accordingly now six species of Simiadæ in Ceylon, reckoning as one the mountain representative of Pr. cephalopterus."

Of Pr. ursinus, he remarks,—"They are usually seen in large numbers jumping on the trees, and when disturbed make a peculiar short howling noise. One was known to have attacked a cooly on a coffee estate carrying a rice-bag. The Malabars eat the flesh of this Monkey, and consider it very delicious food; and some Europeans who have tasted it are of the same opinion.

"Pr. priamus is not confined to the low country in the north. They are seen skirting the Kandyan hills and occasionally on the hills. This place (Trincomali) is full of them; but as yet I have not seen the Pr. thersites. It is found lower down in Bintenne, and in the Wanny district." *MS.*

Pteropus Leschenaultii, apud nos (p. 155), is described by the name *Pt. seminudus*, Kelaart, *n. s.*

Two species are assigned to the restricted genus Rhinolophus. One—Rh. fulvidus, Kelaart,—affined in colouring to Hipposideros fulvus, Gray,—is thus described.

"Rh. rubidus, Kelaart, *n. s.* Head and body of a deep orange-red colour. Membrane pale brown. Interfemoral membrane enclosing the whole tail, and the free edge running almost in a straight line rounded off near the tail. Length of head and body 1½ in.; tail ¾ in.; expanse 8 in. I am unable," adds Dr. Kelaart, "to give a description

of the complicated nasal processes, as all the specimens received were dried and imperfectly preserved. This beautiful Bat is seen at Kadoogavana (2000 feet), only for a few days in the month of August."

The other he does not name, but describes as follows:

"Rh.—*n. s.?* Rufescent-brown—face slightly fulvous. Round the ear and on the sides of the posterior half of the body bright fulvous. Tail enclosed in the interfemoral membrane. Head and body $2\frac{1}{2}$ in.; tail 1 in.; expanse 11 in. Only one dried specimen, procured by my brother from Kadoogavana—none seen since."

Of Hipposideros, Dr. Kelaart gives three species in his catalogue, viz.

"H. lankadiva, Kelaart, *n. s.** Length, of a full grown male, head and body $4\frac{3}{12}$ in.; tail 2 in.; fore-arm 3 in.; tibia $1\frac{1}{2}$ in.; carpus $1\frac{3}{4}$ in.; tarsus $\frac{4}{12}$ in. Ears $\frac{10}{12}$ in. broad, and nearly as long; space between them $\frac{3}{4}$ in. Weight 2 oz. $3\frac{1}{2}$ dr. Ears large, acuminate, and emarginated externally near apex; with transverse striæ on their inner surface; naked, with the exception of the inner edge. Muzzle short, but face rather elongated. Body long, covered with soft dusky rufous-brown fur, which is greyish at base. Head, neck and beneath, of a lighter brown colour: pubis hairy. Interfemoral membrane acuminated to tip of tail, which is not exserted. No frontal sac, but two tubercular points from which grow stiffish hairs. This Bat is found in great abundance in and about Kandy. I have seen several from the Kornegalle Tunnel, which swarms with them. It is the largest of all the Rhinolophinæ hitherto seen in Ceylon."

The other two are described as H. Templetonii, Kelaart, (*Rh. voulha*, Templeton†), which is no other than H. speoris,—and H. atratus, Kelaart (*Rh. ater*, Templeton), which is the supposed variety of H. murinus noticed in p. 157. Besides the latter, as before stated (p. 156), Dr. Kelaart forwarded to Calcutta a specimen of what we presume to be H. vulgaris, (Horsfield), apud Gray, of India,—and one of indubitable H. murinus, (Elliot). We accordingly recognise

* No doubt this is the dubiously cited Rh. insignis of Mr. Waterhouse's Catalogue,—insignis being a true Hipposideros, while pusillus is a restricted Rhinolophus, and the latter therefore cannot be the small Indian Hipposideros noticed in p. 156.

† "*Voulha* is a very vague term for a species of Bat, as it is the Cinghalese word applied to all Bats."—Kelaart.

the following as Cinghalese species of HIPPOSIDEROS.—1. H. LANKADIVA (v. *insignis ?*).—2. H. VULGARIS?—3. H. SPEORIS (v. *voulha*).—4. H. MURINUS.—5. ? H. MURINUS, var? (v. *ater et atratus*).

Of NYCTICEJUS, Dr. Kelaart only gives N. HEATHII and N. ISABELLINUS, nobis, *MS.*, which latter is N. TICKELLI, nobis, described p. 157, *ante*.

The four species of HERPESTES are given as H. VITTICOLLIS, H. GRISEUS, H. FLAVIDENS *(n. s.)*, and H. RUBIGINOSUS *(n. s.)*; and the two latter, he adds, "may turn out to be two new species discovered by Mr. Elliot." They are thus described:—

"H. FLAVIDENS, Kelaart, *n. s.* Yellowish-brown. Hair annulated with brown and yellow rings, tips yellow. Tip of tail reddish. Muzzle blackish. Face brown, slightly ferruginous. Ears fulvous, thickly clothed with hair. Feet blackish. Soles $\frac{3}{4}$ bald. A full grown specimen obtained at Kandy measured as follows: Length of head and body $16\frac{1}{2}$ in.; tail $12\frac{1}{4}$ in.; sole 3 in.; palm $1\frac{3}{4}$ in.; * * * This species was supposed hitherto to be only a variety of H. GRISEUS, but there are strong characteristic differences between the two: the golden-yellow rings and tips of hair are very marked. Generally found in the higher parts of the island. I obtained one of a very deep brown and yellow colour from Newera Elia.

"H. RUBIGINOSUS, Kelaart, *n. s. Deeta*, Cingh. Nearly as large as H. VITTICOLLIS. Reddish and ferruginous brown. More of the red on the head and outer sides of legs. Hair, annulated black and white and terminating in long reddish points. Muzzle flesh-coloured. Sides of nose and circle around the eyes of a light rusty colour. Feet black. Tip of tail black.—I am indebted to my friend M. Casie Chitty, District Judge of Chilow, for a live specimen of this animal, among several others which he very kindly placed at my disposal." Whatever the former may be, that here described would seem to be identical with H. ELLIOTI, note to p. 162, *ante*.

The dark variety of PARADOXURUS ZEYLONICUS, formerly termed by Dr. Kelaart *P. montanus*, he now describes as P. ZEYLONICUS, var. *fuscus*. "Beetle-brown throughout. No streaks on the back perceptible. Fur very glossy; tail with a bright golden-yellow subterminal ring. Newera Elia."

Four Shrews are enumerated by the names SOREX MURINUS, S. MONTANUS, Kelaart, (p. 163, *ante*), S. FEROCULUS, Kelaart, (*S. macropus*, nobis, p. 163, *ante*), and S. FERRUGINEUS, Kelaart, described as follows :—

"Fur soft, ferruginous-brown washed with blue; smaller than the S. MONTANUS; feet and legs naked. Large secreting glands on the pubis—odour very disagreeable. No cetæ or" [misprint for *sebaceous ?*] "glands could be traced on the other two species, nor had they any of the smell." From this last remark, we infer that S. MONTANUS et S. FERRUGINEUS of Dr. Kelaart are brought together under the name MONTANUS in p. 163, *ante*. If so, we still think them to be identical.

With reference to the "large black Shrew" mentioned in p. 164, *ante*, Dr. Kelaart adds: "There are two other and larger black Shrews than any of those now described—one in the possession of Mr. Thwaites of Peradenia,—and the other has a very powerful musky odour, stronger even than in S. MURINUS,—occasionally seen in the godowns at Kandy,—of which further notice hereafter." *In epistolâ* he further remarks, "there is also a TUPAIA, I think."

Of MURIDÆ, Dr. Kelaart's MUS ARBOREUS, Buch. Ham. *MS.*, is M. NEMORALIS, nobis, p. 168, *ante*;—M. DUBIUS, Kelaart, is most probably M. INDICUS, Geoffroy, apud nos, p. 167, *ante*; M. TETRAGONURUS, Kelaart, we take to be M. RUFESCENS, Gray; M. MUSCULUS apud Kelaart, to be M. MANEI; and M. ASIATICUS, Gray, apud Kelaart, ("Paddy-field Rat,") is undescribed.

Of Porcupines, he writes *(in epistolâ)*: "I am quite certain of HYSTRIX LEUCURA, Sykes, (v. HIRSUTIROSTRIS). I have compared it with Waterhouse's description, and it quite corresponds; so that H. ZEYLONENSIS makes a second species of the genus in Ceylon." He terms it *Heetava*.

Lastly, of the genus SUS, Dr. Kelaart writes *(in epistolâ)*: "I am inclined to think that there are two species or varieties in the island: the Newera Elia boar, and the low country S. ZEYLONENSIS. I will send you skulls, &c."

These annotations are necessary to place Dr. Kelaart's paper *en rapport* with the present article.—*E. B.*

Floods in India of 1849.—*By* Dr. George Buist, *Bombay.*

The rainy season of 1849 was one of the most remarkable that has occurred in India within the present century. On the Western Ghauts no rain fell in May, and but little in June, and it was not till near the middle of July, or full six weeks after the usual time, that the fall became general: indeed, famine from extreme drought was apprehended till near the close of the month. On the 22nd, 23rd and 24th of June, a violent atmospheric commotion occurred all over the country. On the second of these days the barometer fell almost unprecedentedly low at Calcutta, Madras, Lucknow, Hoshungabad, Trevandrum, Bombay, Kurrachee, and Aden, the first and last two places being 3000 miles apart; and we presume at all the intermediate stations, though from those named alone, returns have been received. The depression of the mercury was infinitely greater than could have been looked for from the amount of storm which followed. At Aden and at Kurachee rain seemed long promised, but none fell. A severe gale swept the upper part of the Bay of Bengal, extending to Arracan and Madras. The ships *Cabrass* and *Victoria* were lost in it, and many others endangered: the ship *Lord Dufferin* lost her helm, and was in great danger, on leaving Bombay Harbour. On this occasion violent rain fell in the Jullunder Doab, along the line of the Chenab and Jhelum, at Simla, Delhi, Agra, and Meerut. At Broach eight inches fell in as many hours, and the fall seems to have extended all over India. From this date, the barometer began suddenly and steadily to rise: on the 25th it had reached 29.722 at Calcutta, and on the 27th 29.716 at Bombay, having all at once sprung up nearly half an inch in two days at the former place, and above a third at the latter.

At this time plentiful showers occurred round Benares and Ghazeepore, when it cleared up altogether for a couple of months, to the great detriment of the country.

At Calcutta three inches of rain fell on the 27th, and 2.40 inches on the 1st, and again on the 9th July, rain and fair weather prevailing day about. For eleven days on end, not a drop seems to have fallen at Calcutta, and from the 9th to the 25th only two days of rain occurred, when 1.80 inches fell.

The rains at Calcutta had, notwithstanding, up to this time fully reached their average, and there had been no month since the com-

mencement of the year without showers. The quantity that had fallen during the first Monsoon months, was in all 34.28—fall for May 7.44, June 14.40, July 12.24. The total fall for the year had been 40.67—that of 1848 up to 1st August 38.96—the total fall at Calcutta last year was 58.69.

During the first fortnight of the month we had at Bombay seven days wholly fair—on the other seven the rains were very light. On the 16th and 17th, we had heavy falls which now continued with little intermission. While a plentiful supply of rain was thus being provided for the Malabar Coast as far North as Guzerat, all along the Ghauts, around Sholapore, and over a great part of Candeish,—only a few showers had occurred over the Deckan. At Ahmedabad so late as the 27th July, a famine was apprehended: Kurbee, which sold last season at 60 bundles, was selling for 16 to the rupee. The Saugor and Nerbudda Territories were suffering still, most severely. Around Deesa and along Mount Aboo by Sehore, Ajmere and Nusseerabad, and all over Rajpootana,—at Delhi, Meerut, Agra, all along the North West Provinces,—such was the deficiency that a terrible scarcity and famine was apprehended. The barometer stood high, and the heat was excessive; and though there seemed frequent promises, there was no actual fall of rain worth notice anywhere. On the 22nd the first threatenings made their appearance. A hurricane swept the Jullunder Doab, carrying every thing before it. A similar gale levelled the barracks of H. M.'s 32nd with the ground: a kindred one destroyed the barracks at Ghazeepore. Heavy rain fell at Meerut, but did not reach Delhi, though it raged all around. A severe thunder-storm with rain occurred at Poona, and heavy showers fell at Ahmedabad: it poured in torrents at Bolarum. On the 25th, a tremendous burst occurred all over India. At Bombay, where it had been raining heavily before, the unprecedented fall of nearly a foot occurred, and sixteen inches fell in three days. An Arab ship was dismasted half way across from Muscat. A heavy fall occurred at Poona, and all over the Deckan, at Sholapore, Ahmednugger, Surat, Ahmedabad, Agra, Meerut, and Delhi,—reviving the hopes of the husbandmant, and substituting the prospect of plenty for the apprehension of wan, On the 25th and 26th, it rained and blew violently at Phoonda Ghát.

the Barometer falling to 27.924; the lowest it had been during the season. In the course of four days, 26 inches of rain fell at the Ghaut: in the same time above 40 fell at Mahábáleshwar.

Violent rains occurred over the Southern part of the Chinese Empire in May and June: up to the middle of July the fall was heavy, and the Barometer low. On the 26th July, one of the most furious storms of rain and hail ever known occurred over the south of England.

Even with the limited information we possess, a multitude of singular facts are here disclosed to us, one of the most striking of which is the diversity in the state of the air in matter of humidity, when the rains were at their wildest. Taking the crisis of the 22nd June as an example we find the wet and dry bulb thermometers to have stood as follows at their maxima and minima at the following places:

	Bombay.		*Madras.*		*Aden.*		*Kurrachee.*		*Trevandrum.*		*Hoshungabad.*	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Dry, ..	84	81	97	83	95	87	93	83	83	76	79	No return.
Wet, ..	81	78	78	75	76	78	84	80	80	75	77	No return.
Difference,	3	3	19	8	19	9	9	3	3	1	2	——

Then we have the air at Madras in the midst of frequent rain, though not the rainy season, nearly as dry as it is with us during the fair weather; while at Aden, June seems the driest, January one of the wettest months of the year. This is one of the most important conditions of climate:—observations with the wet bulb are almost as easily made, as with the dry-bulb thermometer—they ought on no account ever to be omitted.

The following rain returns will show the amount of fall, in inches, for May, June, and July on this side of India.

	Bombay.	*Poona.*	*Surat.*	*Nassick.*	*Asseergurh.*	*Ahmedabad.*	*Phoonda Ghaut.*	*Mahabaleshwar.*	*Paunchgunny.*
May,	——	0.405	——	——	0.23	2.03	——	——	——
June,	22.80	9.055	11.16	8.63	5.45	4.16	50.00	59.90	——
July,	51.60	6.425	19.00	7.03	16.31	7.62	83.00	89.24	——
Total,	74.40	15.885	30.16	15.66	21.99	13.75	133.00	149.14	11.95*

At Calcutta the fall in April, was 1.25; May 6.00; June 13.00; July up to 24th, our latest returns, 8.25. Total 28.50.

* Up to 15th July.

Hail-storms usually occur in our dry—most frequently in our hot weather in India: the most severe hail-storm yet recorded for the year 1849, was that at Jaulnah on the 15th January, though many of much severity happened all over Lower Bengal in the months of April and May. Those of the 3rd of the month last named prevailed all over India, from Ootacamund to Peshawar. A very severe hail storm occurred at Bassein on the 2nd June. The Malwa hail-storm of the 6th and 7th June, was unusually late for the season. We now find heavy hail falling at Mahábáleshwar for three days on end, on the 27th, 28th and 29th July—during the very wettest of the season—without thunder or lightning or storm.

These results have been thrown together with a view of conveying all the information that can be collected from all parts of India over the heaviest of the rainy season: and imperfect as they are, compared to what they might readily be made, we venture to say that a much larger amount of information has been conveyed by them than is to be found in any single paper or in any similar space. Papers on similar subjects are now issued by the Greenwich Observatory, quarterly, like the Chancellor's Accounts; and the Government of India would be conferring a service on the public were the example set at home to be copied by them.

The season along the North West Frontier from this time forward presented the most anomalous results. On the 3rd August the rain fell with the utmost violence all along the Malabar Coast, and another period of unusual and general disturbance now made its appearance just before the final drawing off of the rains—for at Bombay, on the 4th, just as the moon had attained its full, the barometer suddenly rose by a quarter of an inch in thirty-six hours' time—the weather became showery and open: this state of matters extending at least a hundred miles into the interior. On the 3rd a severe storm occurred off the mouths of the Ganges, in which a large vessel belonging to the king of Burmah was lost. The next full moon and the weather all over the country was changed. On the 17th of August there seems to have been a general fall of rain all over the country, though much more moderate in amount, than many of those which had previously occurred.

On the 27th July, violent rain began to fall at Simla, and so continued almost without cessation up to the 7th August. On the 29th,

heavy rain fell at Wuzeerábád and Lahore. At Delhi and so on to Benares after the first down-pour, the rains became light and irregular: at Almorah, during the first four days of August, a very heavy fall occurred. At Allahabad scarcely a shower fell betwixt the 24th June and 4th August, when on the 5th, a tremendous down-pour occurred, and so continued till the 15th.

Up to the middle of August scarcely a drop had fallen since the end of June and commencement of July, and the crops were completely burnt up: the river Bheema was nearly dry, and at Jaunpore the cultivators were endeavouring to keep their cattle alive with sugarcane. While abundance of moisture was making its appearance on every side, at Ferozepore, and all along to the S. E. branch of the Sutlej, a few casual showers were all that had occurred, the fear of famine beginning to become universal. Around Lahore and Mooltan, and so by the banks of the rivers, the country was completely inundated; while at Ferozepore the drought continued fierce and unmitigated. At Kurrachee, in Lower Scinde, where rain rarely ever falls, a heavy shower fell, and some thunder occurred on the 4th August, and again on the 16th, the whole month of July having been thick and cloudy, with a few drops of fall every now and then.

The month of August was generally open all over the country—from the 17th, indeed, along the Western Seaboard, the Monsoon appeared to have been over, when on the 1st September it rained with double fury, no less than ten inches having fallen at Bombay, in the course of the week—betwixt 20 and 30 inches fell on the Seaboard, and considerably above double this on the mountains in the course of the month—the fall along the Lowlands having been betwixt 130 and 150 for the Monsoon or double the average. On the Eastern Coast again from Lat. 15° S. showers fell during the season, usually fair with them, the dry weather on the Coromandel Coast corresponding with the rains in June, July, August and September in the other parts of India—their own rainy season in November, December and January, was one of the most deficient ever known within the Madras Presidency.

At the beginning, and again near the middle of August, a tremendous fall appears to have occurred along the range of mountains bordering the Western and North Western Frontier of the Punjab: the Indus, Jhelum, Chenab and Ravee, came down in irresistible fury, and burst

through all their borders, deluging the country as they went. On the 3rd of August the cantonments of Wuzeerabad on the Chenab were entirely flooded, and the troops required to be moved. This however was a trifling matter in comparison to what followed a fortnight afterwards. A tremendous fall occurred in the mountains of Cashmere, from which the Jhelum draws its waters. The inundation which followed deluged the plains below the salt-range. At Pind Dadun Khan, the Government salt stores were washed away—at Shahpore, a little further down, the cantonments were swept away, and the troops compelled to withdraw to a distance of five miles. The flood gathered force as it advanced by a heavy fall of rain, about four inches having been measured in the course of the night, betwixt the 15th and 16th at the usually dry station of Mooltan. About 80 miles above this the river burst through all its embaukments, and laid the whole country under water, the bastions, outworks and other works of Mooltan, which a year before had for four months defied all the efforts of our Artillery, melted into the flood. On the 16th, three magnificent domes fell, and at 7 on the morning of the 17th, the enormous cupola of the Bahawul Huk came thundering to the ground, with a noise like the explosion of a stupendous mine. The whole structures were built of unburnt bricks. No such flood had been known to occur. The effects of the delnge were felt at Sukkur, and all down the course of the Indus.

The burst of rain during the first two weeks of September occasioned a second series of floods further to the South. The town of Cambay was completely inundated by the flooding of the Mahi on the 19th, in conjunction with a tide of almost unprecedented height: seventy houses fell, hundreds of others sustained most serious damage. To the South of Surat, no river of any size finds its way to the Western Ocean, though the vast streams which discharge themselves in the Bay of Bengal have their sources in the Ghauts close by, and are of course affected by the Western Rains. On the 10th the Godavery rose in the Nizam's dominions to an unusual height: the river Moosa which takes its rise to the westward of Hydrabad, swollen by the rains which had prevailed for a fortnight all over the country, burst through all its banks. On the 12th it burst into the city, washing down the walls, levelling the houses, and destroying the neighbouring cantonments. A rise of a few feet more would have choked up the bridges,

and most likely have carried them away. The torrent was awful,—it was an immense resistless mass of turbulent water threatening to engulf everything within its reach. It was a beautiful sight to see so slender a fabric as the bridge built by Major Cladpole spanning the flood: the waves, like huge giants, rushing forward to lash its sides. The water rushed to within six feet of the arch, but did no harm. The freshes visited Coringa at the debouchure of the river and nearly inundated the town. The house of the Collector, the highest in the place, was three feet under water—all the rest were submerged. The loss of property was immense.

Remarks on Showers of Sand in the Chinese Plain. By D. J. Macgowan, M. D.

From the Chinese Repertory.

The phenomenon of falling sand is occasionally observed through a great extent, if not the entire portion of the vast Plain of China. It is of such frequent occurrence that the Chinese regard it with no more surprise than they do the flitting meteor. Probably no year passes without several of these showers, though frequently so minute as to escape general observation. Perhaps as often as once in three years they are very heavy, but it is seldom that sand falls in such a large quantity as it did during the last shower. The phenomenon was witnessed three times during the present year, within a period of five weeks; the last and greatest commenced on the 26th of March, and continued four days without intermission, varying however in intensity. The wind blew from the north, northeast, and northwest, frequently shifting between these points, and varying in strength from a perfect calm to a brisk breeze. The altitude of the barometer was from 29.40, to 30.00 (rather lower than before and after the shower). The thermometer ranged from 36° to 81° F. No rain had fallen for six weeks, and the hygrometric state of the atmosphere was very high. Neither cloud, fog, nor mist obscured the heavens, yet the sun and moon were scarcely visible, the orb of day appeared as if viewed through a smoked glass, the whole sky presenting a uniform, rusty hue. At times this sameness was disturbed, exhibiting between the

spectator and the sun the appearance of a water-spout, owing to the gyratory motions of the impalpable mineral. The sand penetrated the most secluded apartments; furniture wiped in the morning would be so covered with it in the afternoon, that one could write on it legibly. In the streets it was annoying, entering the eyes, nostrils and mouth, and grating under the teeth. My ophthalmic patients generally suffered a relapse, and an unusual number of new cases soon after presented. Were such heavy sand storms of frequent occurrence, diseases of the visual organs would prevail to a destructive extent. The effect was the same when observed from the Ningpo Tower, and from the summit of the low mountains in the neighbourhood of the city.

The specimens I gathered fell on a newspaper placed on the roof of a house. The whole quantity which fell was about ten grains to the square foot. It should be remarked, however, that during the four days, the dust seemed suspended in the air for several hours at a time, scarcely an appreciable quantity falling during these intervals. The Chinese call it *yellow sand;* it is an impalpable powder of that color, and wholly unlike the dust which fell throughout this and the adjoining province of Kiángsú, March 15th, 1846. (See Journal of the Asiatic Society of Bengal, and Chinese Rep., Vol. XVII. page 521). It was observed at sea, at Hángchau, and at Sháng-hái. Whence did it originate? The opinion of the Chinese on this subject may, I think, be regarded as correct. They assert that it comes from Peking. We know that the sand of Sahara is sometimes elevated by whirlwinds into the upper currents of the air, and deposited in the Atlantic, twelve hundred miles, sometimes directly opposite to the trade winds. Over against the vast alluvial Plain of Eastern Asia is the ocean of sand—the Desert of Gobi or Shamoh, extending from near the sea westerly 2,300 miles, and 3 to 400 broad—including the conterminous sandy districts. Like its counterpart in Africa, it is subject to whirlwinds which raise its fine dust like the waves of the sea, and doubtless at times waft it into the upper currents of air, and transport it to distant regions. I have been informed by intelligent natives of Kiángsí and Honán, that the phenomenon occurs in those provinces also. Assuming the Mongolian steppes to be the source whence these showers descend, the amount of sand which is annually conveyed hither must be prodigious to cover such an extensive area. Regarded

in a meteorological and in a geological point of view, these showers possess no small interest; but if my conjectures respecting the part which they play in the economy of nature be well founded, they are of higher interest to the agriculturists of this most densely populated region. I would premise the suggestion with the remark that the Chinese, who from remote antiquity have been close observers of everything pertaining to agriculture, all agree in asserting that a shower of dust indicates a particularly fruitful season. They, it is true, never refer to the dust as the *cause* of good harvests, but such invariably followi its fall. The humus of this great alluvial tract is extremely compact, and to some extent is probably segregated and loosened by the sand of Gobi being scattered over its fields. Those two great rivers, with several smaller ones which drain the Plain, are ever bearing to the sea the lighter portions of the soil, and so tinging it as by its hue to give name to that part which laves these shores. These remarkable showers then are replenishing and diluting the soil which rains and rivers are ever impoverishing. It is not supposed that all the detritus which is conveyed to the sea is the sand which by these remarkable showers is brought from the sterile wastes of the North, but there can be no doubt that much of the matter of the Yellow Sea is from that source, and also that the sand acts favorably on the soil.

The extraordinary rains of the previous year, the injury to the crops and soil, and consequent famine, lead us to hope that the anticipations of the husbandmen may not be disappointed, whether the theory here propounded be correct or erroneous.

Ningpo, April 26th, 1850.

Note.—It has been ascertained by Ehrenberg that the dust or yellow sand which falls like rain on the Atlantic near the Cape de Verde Isles, and is sometimes transported to Italy, and even the middle of Europe, consists of a multitude of silicious-shelled microscopic animals. "Perhaps," says Humboldt, "many of them float for years in the upper strata of the atmosphere, until they are brought down by vertical currents, or in accompaniment with the superior current of the trade-winds, still susceptible of revivification, and multiplying their species by spontaneous division, in conformity with the particular laws of their organization." Further research may show too that the sand in the Chinese Plain contains animalculæ.—*Ed. Ch. Rep.*

A Twentieth Memoir on the Law of Storms in the Indian and China Seas, being the April Cyclone *of the Bay of Bengal; 23rd to 28th April,* 1850.—*By* Henry Piddington, *President of Marine Courts.*

(Concluded from page 61.)

SUMMARY.

I now state the grounds on which the positions of the centre on the various days and from them the average line of the track has been laid down.

On the 22nd April.—We have no bad weather for the ships fairly within the Bay, but the *Barque Iron Gem* had bad weather in 6° 47′ N.; and 87° 49′ East, in which she lost the main piece of her iron rudder by the blow of a sea. The wind was with her at Noon at N. N. W. veering to W. N. W. by the following day, and she was at 210 miles S. W. b. S. of the *Cowasjee Family,* which ship had only moderate breezes and latterly squally weather from N. b. E. to E. N. E. The *Iron Gem,* then, may have been on the Western edge of a small Cyclone, but, as it bore E. N. E. of her, the *Cowasjee Family* would if she had any part of it have had the centre nearer to her, and consequently as bad or worse weather. I am inclined, then, to think that the *Iron Gem's* gale was for this day an instance of the Westerly equatorial monsoon reaching very far to the North; or of the S. W. monsoon of the Bay setting in.

On the 23rd April.—We have the *Nereid, Eneas, Duke of Wellington* and *Atiet Rohoman* between 15° and 17° North with light and moderate airs between E. N. E. and North, but with no indications of a coming Cyclone, their Barometers also ranging from 30.00 to 29.85. To the Southward, however, *the Cowasjee Family* in 11° 45′; and the *Iron Gem* in 6° 40′ had, being now on the same meridian, the first strong N. E. breezes and dark gloomy weather with squalls moderating at 9 P. M.* and increasing again at midnight, and the second a heavy N. W. to N. N. W. gale varying P. M. to W. N. W. with terrific

* This is apparently the usual instance of an interval of moderate weather which is so frequently experienced at the onset of a Cyclone.

squalls. This would place the *Cowasjee Family* on the N. W. and the *Iron Gem* on the S. West quadrant of a Cyclone at more than 300 miles distant from each other, the *Iron Gem* having drifted to the Eastward, and the *Cowasjee Family* run up to the N. N. West in the preceding 24 hours. But then these winds and consequent bearings of the centre, would place it at upwards of 250 miles from the *Cowasjee Family* to the S. Eastward and at 218 miles from the *Iron Gem* to the N. E. b. E. though she had P. M. the wind veering to W. N. W. with terrific squalls showing that if it was a Cyclone she was close to the centre; and the *Cowasjee's* Barometer at Noon this day was still as high as 29.76. I think then that although we might perhaps in strictness say that we had but indifferent data on this day also to assign any centre for a Cyclone, yet as we find it so closely following up and increasing on the *Cowasjee* at midnight that she had then all preparations for a hurricane made while standing to the N. Westward, I have placed a centre for this day in 80° 42′ North; Long. 90° 28′ East, though this will require a large circle to include both ships.*

On the 24th of April.—We have the *Cowasjee Family*, *Duke of Wellington* and *Eneas*, nearly on a curved arc, of which the chord lies from W. S. W. to the E. N. Eastward. Of these three ships we find that the *Cowasjee Family* standing up to the N. Westward had the wind veering from N. E. at 4 A. M.; to North at 10 A. M. and Noon. It was also increasing in violence to "a perfect hurricane" at 9 30 A. M., when, the ship lying to very badly, she very properly bore up and scudded to the S. S. W.

The next ship to the *Cowasjee* is the *Wellington*, at 43′ to the N. E. b. N. of her, with a rapidly increasing gale at N. N. E., having had for the preceding twenty-four hours some warnings from the sky, but the Barometer having continued very high being at 30.00 at noon on the 23rd, and at 29.90 only on the 24th. The *Nereid* and *Eneas* the next ships to the E. N. Eastward had still at noon on this day the light baffling winds which so often precede a Cyclone. The *Eneas*

* In former Memoirs (see Second Memoir, Journ. As. Soc. Vol. IX.) I have found that Cyclones perfectly well traced and of moderate dimensions in the middle of the Bay, and on the Coast of Coromandel, appear to commence near the Andamans as large ones.

notices a heavy swell, but the *Nereid* has not remarked on the sea till near midnight.

We have thus the logs and positions of the *Cowasjee* and *Duke of Wellington* only to fix the position of the centre for this day, and from these we should strictly place the centre in 12° 10′ North; and 90° 58′ East; but, owing to the very acute angle formed by the lines of bearing from the wind-points, this is evidently too far to the Eastward, for it places the centre at 180 miles to the East of the *Cowasjee* which ship had a full hurricane, and at only 120 and 85 miles to the S. E. and S. b. E. of the *Nereid* and *Eneas* with which ships the Cyclone had not yet commenced. The *Wellington* also is apparently by the Chart nearer to the centre than the *Cowasjee*, yet her weather is not described as *very* severe till the afternoon, when Capt. Duncan rightly judging his position and the track of the Cyclone bore up to cross in front of it.

We must farther remark that the positions of the *Wellington* and *Cowasjee* are uncertain, and particularly that of the latter vessel which was carrying sail to the Northward and Westward against the N. Easterly gale. They had moreover no observations on this day, and the log can rarely be much attended to in merchantmen when all hands are busy with the preparations for a gale. It is evident also that the centre was much closer upon these two ships since they were involved in the Cyclone circle than to the *Nereid* and *Eneas*, the positions of which we must take to be correct, since they had fine weather and were but a few days from the Sand Heads, and we shall further see that the Cyclone was, here, one of those of no great extent but of excessive severity within a short distance of its centre. With all these views then I have estimated the centre to be for this day about in Lat. 11° 10′ N.; and Long. 89° 20′ East.

25th April.—On this day at 2 A. M. the centre must have passed between the *Eneas* and *Nereid*, and close to the *Eneas*, as while, or after, dismasting her it veered to the S. East. This ship's log being lost we can only estimate her run from noon and position at this time, nor have we the detailed log* of the *Nereid* either, though the summary

* This is always required, however full and carefully drawn up the abstract of the log may be, because until all the documents are collected it is impossible to say at what hour it may be necessary to ascertain any ship's position. I have fre-

is an excellent, and doubtless a careful one. If we had it we should be able, as she had the wind carefully noted at N. N. E. (9), a full gale at 3 A. M, to assign a nearly exact position for the centre at this time. As it is however we shall not perhaps be far wrong in placing it at 2 A. M. in Lat. 12° 10′ N. and Long. 89° 6′ East. For its position at noon of this day, the *Wellington* and *Cowasjee* having run out of the circle, and the *Eneas* (without any reckoning) clearing her wreck, we have that of the *Nereid* with a heavy gale at W. N. W. and the *Atiet Rohoman* with a N. E. b. Northerly gale, rapidly increasing, having had during the forenoon, the uncertain veerings of the wind between N. b. E. and N. East, which indicate her to have been just on the outer circles of the Cyclone and directly in its path. The French ship *La Meuse* had also a commencement of blowing weather from this day and the bearings from these ships will place the centre at noon in Lat. 13° 32′ N.; Long. 88° 45′ East. The track appears to have curved upwards in a more Northerly direction for these last 24 hours, as if the Cyclone was now "bound" for Point Palmyras, instead of Coringa, which it appeared to be from the 23rd and the 24th. We must not omit to notice here that the *Cowasjee Family*, after cleverly running back by the aid of the Western quadrants of the Cyclone to escape its centre, had now bore up again, being at noon about 250 miles to the South of the centre, but without the actual limit of the Cyclone. She however, found the sea so heavy *from the Northward* that she could carry very little sail. And this sea is constantly noticed in the log up to the 27th, in Lat. 13° 45′ North, the ship thus evidently following in the track of the Cyclone, and *ploughing* through its rearward sea for two days!* We find also on this day the first notice of its approach to the Sand Heads in the "heavy leaden sky" of the *Tavoy's* log and the threatening appearances noticed in the *Coleroon's*, both shewing how clear and unmistakeable the atmospheric indications are if properly attended to, for the centre was on this day at 7½ degrees, or 450 miles, distant from the Outer Floating Light.

On the 26th of April.—We have the *John McVicar* homeward

quently had to calculate the same ship's position twice, and sometimes three times in the 24 hours from her log, to compare it with that of others.

* See Col. Reid's Work "*Progress and Development of the Law of Storms*" where these rearward seas are capitally delineated.

bound, meeting the Cyclone coming up from the Southward and in scudding to cross in front of it, not having accurately calculated its track, she ran too near to the centre, and at 11 A. M. broached to with a shift of wind from North to N. W. so that the centre must have been at this time close to the Eastward and by noon to the N. Eastward of her estimated position, which is given in the extract from the log. The *Neerlandsch Indie* also had the calm of the centre by 3 P. M.* the shift being from E. N. E. to W. S. W. which gives a N. N. W. track for the Cyclone, while our projected one is N. 15° West. By Noon on this day it was also reaching *False Point* and the Pilot station† where all the vessels had a N. E. gale commencing, and the *H. C. P. V. Tavoy* which had stood to sea, having had as will be seen in Mr. Ransom's able report, all the signs of an approaching Cyclone in the course of the 25th and morning of the 26th. This vessel was at noon about 40 miles to the South of the Outer Floating Light and had from daylight a gale oscillating from N. East to East; a bank collecting to the S. W.‡ is also noted in Mr. Ransom's table. At noon the *Tavoy* had the singular interval of perfect calm in the middle of the gale, which he refers to the treacherous calm (meaning the treacherous interval of fine weather), which I have so often noted at the onset of a Cyclone, and which has occasioned the dismasting of so many ships by inducing them to make sail, thinking the gale was over though their glasses had not risen; and we may indeed suppose that many have been lost through it, for had Mr. Ransom been a young or over-sanguine commander, or one with great anxiety to make a passage and little accustomed to tropical tempests, we may easily imagine him making sail and his vessel blown over and foundering with the fierce hurricane which followed, before he could take it in again. The *Joseph Manook* 40 miles to the Eastward of the *Tavoy*, did not experience this calm but had the same indications of a Cyclone. It is interesting to trace here, as we fortunately can so accurately do, the state of the weather from the *Tavoy's* position inwards.

* To avoid confusion this ship's position of noon 26th, being close *at* the centre, is not marked on the Chart.

† As usual with them when a Cyclone is approaching, and probably owing to the effect of the land.

‡ Probably the *Atalanta's* and *False Point* Cyclone.

We find then that the Outer Light Vessel 40 miles to the North of her, which vessel has furnished a very careful log which does her Commander Mr. Mendham great credit, had strong N. E. and Easterly winds with squalls and light showers increasing to a heavy gale at E. N. E. at Midnight, when the Bar. had fallen to 29.60.

At 35 miles farther North, namely at the Saugor *Flat Buoy*, we find by Mr. Smart's report the weather, though more moderate, still blowing hard with peculiar gusts, and about noon at times almost calm, and at 8 P. M. a remarkable low scud flying. The heavy slaty appearance of the sky on this and the preceding days is well noticed by Mr. Smart.*

At Calcutta 60 miles to the north of the Saugor *Flat Buoy*, we had nothing but calms with excessively oppressive weather, and Calcutta is at 278 miles from the centre of the Cyclone on this day.

To the N. Eastward we have the H. C. Surveying *Brig Krishna*, at 175 miles distant to the E. N. E. from the centre, with strong breezes from East to S. E. b. E. and S. E. with a heavy southerly swell and dark gloomy appearances to the South and S. S. W. of her. At *Akyab* there is nothing remarkable in the weather.

To the N. N. W. we have it commencing to blow from the Eastward in heavy squalls, at noon, at *False Point*, 138 miles from the centre. The *Rob Roy* at 83 miles to the N. West had by noon strong gales from the N. Eastward and *La Meuse* at the same distance to the W. b. N. had heavy squalls from N. East veering to North, P. M.; but the *Iskunder Shah*, 128 miles to the W. b. N. had nothing more than threatening appearances and the wind only E. N. E. at sunset, and a high Barometer, so that it would seem that, to the Westward, the Cyclone did not extend so far as to the Eastward and round to the North and N. N. W.

* And the word too is a very good one, for the appearance is at times such we may imagine a slate quarry to present, if the edges of the strata were curved instead of straight and angular: that is, the sky is not one leaden, or slaty-coloured, veil or curtain, but a mass of dim slaty-coloured clouds which scarcely seem to be separate, and are laid thickly over each other. I have described these clouds at Calcutta as a dense mass of strati, cumulo-strati and nimbi, but they were not with us so peculiarly dark coloured (being no doubt thinner) as to assume any very remarkable leaden or slate colour.

But there were evidently at this time (noon 26th) *two* Cyclones, for we find that the *Atalanta*, 150 miles to the S. S. W. of the *Neerlandsch Indie*, had at 11 A. M. of this day, "a sudden shift to the Westward" with tremendous fury, carrying away the three topmasts, mainmast head, &c. Now, this ship had been running down to the S. S. W. with the wind gradually increasing and veering from E. N. E. at P. M. of the 25th, till this time, so that it would appear that this may have been at first a part of the original Cyclone wind, but we cannot say when the separation commenced. The *Ardaseer*, 140 miles to the Westward of the *Atalanta*, had but a strong N. W. b. W. breeze with gloomy weather and heavy swells from the Eastward and S. Eastward, and the *Iskunder Shah* at 150 miles to the N. b. W. of her had as already noted, only threatening appearances up to midnight. *La Meuse* also before noted, which ship was only 47 miles East of the *Iskunder Shah*, had evidently part of the original Cyclone, for she had the wind from N. E. to N. N. E.: at noon and P. M. at North veering rapidly to N. N. W. and blowing a hurricane at 7 P. M., and gradually veering to West at 5 A. M. of the 27th when it reached to the meridian of her position at that time. It would then appear that the North West wind of the South Western quadrant of the main Cyclone, and the S. Easterly wind of the N. East quadrant of the *Atalanta's* Cyclone, must have neutralized or overlaid each other, so as to prevent the main Cyclone's extending so far as the position of the *Iskunder Shah*. The vicinity of the Coast also probably affected the Cyclones in some degree, as it always appears to do.

On the 27th April.—Taking first the *Atalanta's* small Cyclone, we find it on this day at about 7 A. M. dismasting in one furious burst the *Iskunder Shah*, and continuing till midnight a severe hurricane, before it began to break; but it was not of any great extent, for by noon on this day it was fine with the *Ardaseer* though only 60 miles South of the position which Capt. Shire assigns to the *Iskunder Shah*.

Returning now to the principal Cyclone, we find that the *Krishna*, *Joseph Manook*, *Tavoy* and *Beacon Light Vessel*, had all on this day from midnight, severe gales from East and E. S. E. to S. E.: S. S. E. and S. S. W. moderating in the afternoon and evening according to their positions, being all more or less from 100 to 110 miles to the North Eastward and E. N. Eastward of False Point.

At False Point itself, though the centre of the main Cyclone undoubtedly passed over that station, yet there were some anomalies, occasioned I have no doubt by the action of the *Atalanta's* Cyclone, which deserve careful notice.

The Cyclone at False Point on the 26th had veered from East to S. E. and South, and at 9 P. M. to the S. West, when it moderated and fell almost a calm with a clear sky, a bright moon and stars shining over-head but a very thick mist surrounding the horizon. At 3 A. M. on the 27th, it began to blow from the N. West "a complete hurricane" till 5 A. M., and at 8 A. M. the wind is again marked S. S. E. and the gale terminates with the wind about South to S. b. W. The time of its becoming a moderate breeze is not marked.

The Easterly wind veering to S. W. would indicate an average N. N. W. course for the Cyclone, but the calm at the S. West wind point, and the subsequent heavy gale at N. W. though of so short a duration, indicates either that the centre now vibrated to the Eastward,* or that the ordinary action at the centre was in some way disturbed by the *Atalanta's* and *Iskunder Shah's* Cyclone just noticed, which may (as the smaller whirlwinds certainly are) have been absorbed into it, and have thus augmented its intensity and velocity.

At Balasore 68 miles to the N. b. E. of False Point we find the Cyclone to have fairly begun (with all the usual and precursor signs on the 26th) at 5 A. M. on the 27th, according to Mr. Bond's careful report; and to have veered in its passage from N. E. to W. b. S. which will give an average track of N. N. W. $\frac{1}{2}$ W. for it at this time, the centre passing up to the East of Balasore, 20 to 40 miles to the W. S. W. of which station the *gale* is stated to have been moderate, and very moderate.

Mr. Bond states that there was a brief lull for about five minutes at Balasore, when the wind *shifted*† Westerly which seems to have been between 6 and 8 A. M., say at 7 or 7.30 A. M.

* Was this the effect of the junction of the *Atalanta's* Cyclone which as we see was travelling up parallel to the principal one and may have for a time produced this remarkable deflection. In my last Memoir, the Jumna's Cyclone, a small one, appears to have vibrated between two large ones.

† *Veered* is used in the report and *shifted* in the letter. It is to be regretted that seamen do not carefully choose at the time between these two words.

The exact point at which the centre passed appears to have been about midway between Balasore and Jellasore, at the Dantoon staging Bungalow,* as described in Mr. Campbell's brief but valuable note, which is a remarkable instance of how important even the briefest common-sense narrative of the passage of these meteors may be to us. Capt. Spens' more detailed and careful account of his observations in a lonely sea-shore Bungalow, without any instruments, is another instance to shew that great light may be often thrown upon questions of which the observer may not perhaps think at the time, for his account, with Mr. Baillie's, and that of Mr. Brackley in October, 1848, Jour. Vol. XVIII. p. 849, aid us much to understand for the future the terrific accounts of the inundations from the great storm Waves, when their elevation, the time of tide, and the intensity of the Cyclone are such that they are raised to their highest point.

The centre at noon 27th must have been about Lat. 21° 45′ N. Long. 87° 20′ E. or a little to the W. N. W. of Jellasore, since it lulled for about half an hour at 10 A. M.; and thus the true centre at $10\frac{1}{4}$ A. M. or in $22\frac{1}{4}$ hours, had travelled up from its position on the 26th to the Dantoon station, a distance of 218 miles or at the rate of 9.8 miles per hour: though it seems latterly to have travelled at a greatly augmented rate, for it was bearing about West of the station of Midnapore at noon, or had travelled according to this estimate, something more than 30 miles in an hour and three quarters. It is possible that this increased velocity may have commenced after the irregularity at False Point, to whatever cause that was owing. We must however, observe here that the wind is stated also to have been due North at noon at Bancoorah also, which station is 60 miles to the N. N. West of Midnapore; the fact being, as I have elsewhere shewn, that the mere surface winds on shore, are but very indifferent guides for the position of the centre. Midnapore has many irregularities of surface, but Bancoorah has much more of these, and we cannot really say in what direction the actual wind was blowing at the different stations. It is only the calm centres which we can trust to for an accurate estimate of the track of the Cyclone.

28*th April.*—We have no farther reports of this Cyclone beyond

* *Anglice*—Traveller's cottage-house, at the stations where the palanquin bearers are changed.

Bancoorah, and we have next to consider whether that described on the 28th in Capt. Sherwill's report from Berhampore, could have been the Midnapore one curving to the N. N. Eastward? Berhampore bearing N. N. E. 120 miles from Midnapore, and the calm centre passing Berhampore by Capt. Sherwill's exact observations at 4 A. M. on the 28th, or about 16 hours after it was abreast of Midnapore, would give a rate of travelling of about 8 miles per hour. I am thus inclined to think, that this *was* the original main Cyclone, which was deflected by the line of the Rajmahal hills, and that the remarkable appearance which I have described at Calcutta, if it was what we might readily suppose it to be, (and I still think it may have been a division of the Cyclone seen by me,) did not give rise to the Moorshedabad Cyclone. There is nothing, however, impossible in the heavy bank to the Eastward having been an independent Cyclone, for we have no reports from Jessore, Dacca, or Krishnagur, in which districts it would have been felt, but if it had been violent we should probably have had some. Moderate gales, no one, I regret to say, thinks it worth while to report.

We have, nevertheless, it will be seen, traced this formidable Cyclone, from undoubted evidence over a track of 1000 miles as in the following table.

Dates. 1850.	Course.	Distance.	Rate per Hour.
23rd to 24th April.	N. 42° W.	192	8.0 Miles.
24th to 25th	N. 13° W.	148	6.2
25th to 26th	N. 15° 30′ W.	287	12.0
26th to 27th	N. 3° 10′ W.	217	9.1
27th to 28th	N. 18° 00′ E.	156	6.5
		1000	41.8
			8.4 Average.

Its average course *at sea* (for we should in fairness reject its land progress) was N. 17° 38′ W. and the entire average rate of its progress for the whole five days was 8.4 miles per hour. The variations in the rate of travelling, exactly correspond with what has been before

shewn in various memoirs, and which I have now no doubt constantly occur.

Remarks on the management of the ships.

The vessels which have suffered in this Cyclone, are numerous enough to make it worth while, for future instruction, to state briefly what their management was, and might have been, or what the peculiarly deceptive or adverse circumstances were which placed all management, so far as to avoiding the Cyclone, out of the question.

1. *Iron Gem.* Disabled by an accident.

2. *Cowasjee Family.* Should have stood out to the Westward so as to raise her Barometer at midnight 23rd—24th, and then, being bound to the Northward, should have hove to till the wind was N. W. when she might have run round the heel of the Cyclone, and up with it; carrying Southerly winds on its Eastern quadrants, which would have saved time and the risks of the severe weather and heavy seas she had; otherwise she was well managed.

3. *Nereid.* Perfectly well managed with a full knowledge of her position; and no doubt escaped the Cyclone by that knowledge and management.

4. *Eneas.* Was crossing in front of the Cyclone, but did not steer sufficiently to the Westward to *raise* her Barometer, which fell 0.3 between noon and midnight. S. W. or even W. S. W. till she obtained a fine-weather Barometer, was her safe course.

5. *Atiet Rohoman.* This ship hove to to allow the Cyclone to pass her. She might by running off to the W. S. W. and S. W. and gradually hauling to her course, have made a fair wind of it; *if* she steered well enough to allow of her doing so.

6. *John McVicar.* The same error as the *Eneas*, in crossing too closely. With abundant sea room the safe plan is always to haul out for a good and rising Barometer before crossing.

7. *Duke of Wellington.* This ship was like the *Nereid*, capitally well managed, and with a thorough knowledge of her position.

8. *H. C. Surveying Brig Krishna.* Knowing her ground perfectly, and with the long experience of her able Commander, there could be no question that this vessel would heave to in the right time and place as she did; but a merchantman would not act prudently in running in quite so close to the Sand Heads before heaving to, to say

nothing of its being perfectly useless to do so, since she would be ordered to sea again.

9. *Neerlandsch Indie.* This ship unfortunately hove to exactly in the track of the Cyclone. She should have run off S. W. or S. W. b. W. at 10 P. M. on the 25th; or at midnight at latest, and have gradually hauled to the Southward on her due course, as the wind and her Barometer would have shewn her that she was rounding and passing the Cyclone.

10. *La Meuse.* Hove to at the proper time, but might have run off a little to the Westward to allow the centre to pass her, hauling round it as the wind came to the Westward of North, so as to make a fair wind of it throughout.

11. *Rob Roy.* Had been standing off from the land but might also have run to the South and round the heel of the Cyclone, by which she would have avoided all the risks she ran with a shifted cargo.

12. *Iskunder Shah.* Deceived by her Barometer (a good Simpiesometer would probably have shewn the danger) and hampered with the land could do no better.

13. *Atalanta.* We have no account of this ship's Barometer till the 26th, when she appears to have run into the parallel Cyclone; theoretically, she was running very fairly to the S. S. W. to avoid the first. This can only be explained by supposing she was close to the spot where the second Cyclone descended, or was developed from the main one.

We have thus—

Ships well, and perfectly well managed, ...	5
—— Crossing too close in front of the Cyclone, ...	2
—— Embarrassed by the land or deceived by their Barometers, ..	3
—— Hove to in the track of the Cyclone, ...	1
—— Ran dangerously too close in, ...	1
Total,.....	12

The most remarkable and important phenomenon of this Cyclone, however, is the undoubted fact of the very limited fall of the Barometer, as compared with the intensity of the storm, which we see successively dismasted, or disabled, or damaged, in its progress of five days,—the *Iron Gem, Eneas, John McVicar, Atalanta, La Meuse, Iskunder Shah, and Neerlandsch Indie*, and has no doubt done other mischief of which we have no account.

This fact of the little fall of the Barometer until the centre was close upon the ships may be connected with the limited extent of the Cyclone itself. I have elsewhere remarked* that for a distance of 100 to 150 miles from the centre, there seems to be no exact rates of fall by which we can estimate the distance of the centre; and in this the Cyclones appear to assimilate to the smaller tornado-Cyclones, tornados and whirlwinds, which, we have reason to believe, do not affect the Barometer to any remarkable extent on their approach. The vigilant seaman and the philosopher will see in this a strong argument for a careful investigation and registration of the various atmospheric signs upon which I have so much insisted, until we can obtain a complete code of these also, and furnish all observant seamen with a BAROMETER OF SIGNS.

On a Series of CALDERITE *Rocks.—By* HENRY PIDDINGTON, *Curator Museum Economic Geology.*

My analysis of Calderite (in Vol. XIX. p. 145, of the Journal) was of course performed from the best and most homogeneous (i. e. approaching to perfectly mixed) specimen which could be obtained. It will nevertheless be remarked in that paper, which describes the specimen analysed as the type of the rock, that, with the magnifier the siliceous mixture which constitutes it a rock is distinctly seen in thin splinters when held against the light. I have been able, from the late Mr. Williams' abundant supply of these so called Iron ores, the whole of which are Calderite, to obtain a very curious and instructive series of specimens, illustrating distinctly the formation of the Calderite by the mixture of the siliceous with the Iron and Manganese mineral, like the large and small grained granites, in the first of which the silex, felspar and mica seem rather to be agglomerated in masses than to form a true compound rock, and in the latter the component parts are only seen by a magnifier. I have therefore selected for our Museum, and for the guidance of geologists and mineralogists a series of fourteen of these specimens. I think it right to give a brief description of each, so as to enable them to recognise the rock in its various appearances.

* Horn Book.

No. 1.—Is a common transparent quartz rock, in which on the one side the Iron and Manganese mineral is seen only in small and minute rounded specks like Melanite garnets, as if a little of it in powder had been melted up with the quartz.* Towards the other side of the specimen it is seen to increase in quantity, forming small nests and short veins; and on the extreme part of it the nests become large, and there are also seen mammillated coatings of the Iron and Manganese upon the quartz. When the mineral is fractured at these nests the Iron and Manganese appears as a brilliant black granular mass.

No. 2.—In this the quartz is no longer massive, but, like the Manganese and Iron, is in coarse grains as if a sort of coarse conglomerate of the minerals had been formed; on one side this specimen passes into No. 7.

No. 3.—The coarse grains of No. 2, are here smaller; the weathered surface resembles a granular brown iron ore.

No. 4.—The granulation is here much finer, and some specimens, if superficially looked at, especially on the weathered surfaces, might pass for a coarse brown and red sandstone. On the fracture it has the appearance of a coarse brownish-white sandstone.

No. 5.—The sandstone appearance assumes in this variety a resinous glance on the transverse fracture; and on the horizontal one it becomes laminar and of a reddish-grey, resinous, appearance. The weathered surface glisters like a coarse-grained Diallage or Schiller spar.

No. 6.—In this specimen the Iron and Manganese appears like a coarse granular black Pitchstone, intermixed with dark brown grains of quartz. The weathered surface is porous and of a dull brick-red colour.

No. 7.—The granular structure of No. 6 is here much closer and finer. The weathered surface is of a dirty reddish-brown colour.

No. 8.—The constituents of the mineral are in this specimen so mixed, that they look like a very fine-grained pitchstone-porphyry.

* It is far more fusible than the quartz, and this accounts for the rounded form of the grains. Yet we should have expected, unless we suppose the quartz to have been an aqueous deposit, that mere igneous fusion would have mixed the materials more completely. Some of the recent discoveries of the solubility of minerals in steam, at merely atmospheric pressures, seem to point to a solution of the singular enigmas which quartz and other rocks so often present when we consider them as produced by mere igneous fusion.

The weathered surface resembles that of some kinds of hornblende rock.

No. 9.—A fine-grained resinous rock; like powdered black rosin agglomerated in a mass.

No. 10.—Is the specimen which I have described as the type of the mineral in my former paper upon it; which for the sake of connexion I copy here.

"This rock can be in no way so well described as by saying, at once, that while on the weathered surfaces it resembles a common massive ore of iron, its appearance on the fresh fracture is exactly that of black rosin. When examined by the magnifier it is seen to have a golden resinous (which is yellow quartz) coating, in thin laminæ, especially on some of the fractures. On others it has small specks which are seen by the magnifier to be minute cavities full of a yellow powder.

"The fracture is difficult to describe, being in some places hackly, in others tending to small conchoidal, and in some instances breaking on a large scale into an obliquely rhomboidal cavity, as if the rock would cleave naturally into oblique rhomboidal prisms, or contained crystals of that shape. The most perfect cavity I could measure, for I could not obtain a good solid angle, was one of 124°, giving therefore 56° for the acute angle of the rhomboidal crystal.

"The splinters are often nearly laminar and sometimes highly translucent, like dark brown rosin. When held to the light these are seen to contain, here and there, fragments of bright white quartz.

"The streak is ash-coloured, and obtained only with the file, or on a salient edge by the knife. It is brittle, and easily fractured with a moderate blow. The powder is fawn-coloured. When breathed upon it gives a metallic odour. The latter portions are tough and difficult to pulverise, requiring repeated sifting and hard pounding.

"Its hardness is 7.8. The specific gravity 3.65.

"The solid mineral does not alter by digestion in acids, and even in nitro-hydrochloric acid; hydrochloric acid dissolves a little iron, but in very small proportion (probably from dust) even from extremely thin pieces."

No. 11.—A lighter coloured variety of No. 10; having on some parts, and in a good light, the appearance of impure yellow rosin.

No. 12.—Has the appearance of a resinous pitchstone: That is to say, it is resinous on some fractures and on others almost a pitchstone in appearance.

No. 13.—This last is almost a black and brown, narrow-banded, Jasper in external appearance, but on the fresh transverse fracture it shews a very distinct granular resinous structure and aspect. The tendency of fracture (or of cleavage) is however distinctly in the planes of the laminæ, and when even a minute splinter is held to a strong light the arrangement of the imbedding of the black mineral in the yellow brown quartz is distinctly seen to be horizontal and parallel like the bands on the larger surfaces.

The mineral geologist will, I trust, from these descriptions, be enabled to identify this curious rock wherever he may meet with it in any of its varieties; and the importance of mineralogy to geology is now-a-days, too well recognised for me to doubt that, to all lovers of scientific accuracy this paper will be acceptable. We are moreover, in India especially, bound when we bring forward any novelty to shew as clearly, and in as full detail as we can, the grounds on which we do so, as we thus advance the cause of science when we are right, or obtain the correction we need if wrong.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL

FOR FEBRUARY, 1851.

A Monthly General Meeting was held in the Society's rooms, Park Street, on Wednesday the 5th instant, at half-past 8 P. M.,

Hon'ble SIR JAMES W. COLVILE, KT., President, in the chair.

The proceedings of the former meeting were read and confirmed.

The following gentlemen were named for ballot at the next meeting :—

Dr. A. Sprenger ;—proposed by the President, and seconded by the Secretary.

J. H. B. Colvin, Esq., of the Civil Service ;—proposed by the President, and seconded by Mr. Beadon.

Notes were recorded from E. Currie, Esq., W. H. L. Frith, Esq., Lt. Ripley and Captain J. D. Pakenham, intimating their wish to withdraw from the Society.

Letters were read—

1st. From C. M. Montriou, Esq., Superintendent of the Colaba Observatory, forwarding a copy of the first part of the observations made at that Observatory during the year 1847, containing the Magnetic observations.

2nd. From N. Shaw, Esq., Secretary, Royal Geographical Society of London, requesting spare Nos. of the Journal of the Asiatic Society, to complete the set of that work in the possession of the Geographical Society. Ordered that the Nos. be supplied to the Geographical Society.

3rd. From C. Wiedmann, Esq., Librarian of the Royal Academy

of Sciences in Bavaria, forwarding the latest publications of the Academy for the Society's Library.

4th. From Count Freyburg, President of the Royal Bavarian Academy of Sciences, conveying the thanks of the Academy for a copy of Abdul Razak's Dictionary, presented to the Academy by the Society.

5th. From Dr. von Martius, Secretary of the Mathematical and Physical Section of the Royal Bavarian Academy of Sciences, dated 15th February, 1848, requesting a set of the Society's publications.

The delay in the receipt of this letter led to some discussion as to the best mode of facilitating the exchange of publications and the regular receipt of the same, whereupon it was proposed by Mr. J. R. Colvin, that it be referred to the Council to consider the measures which may be necessary, with a view to the regular receipt by learned Societies and individuals in Europe, of the numbers of the Journal and other publications of the Society which are forwarded to them in exchange for transactions and other works forwarded by them. The motion having been seconded by Capt. Hayes was carried *nem. con.*

6th. From Dr. Buist, Bombay, submitting a paper entitled,—"Floods in India, for 1841." Ordered to be printed in the Journal.

7th. From H. Torrens, Esq., Honorary Vice-President, enclosing a note from F. O. Siddons, Esq. of Moorshedabad, on Capt. Latter's Selections from Burmese Literature, and presenting the following books in the name of their Author, Mauluvi Masih-úd-dín Ali Khán Bahádúr, namely, Jadâvaul Talú-e-Gharub, Dariyáe Latáfat, Miftah-ul Reshád.

With reference to Capt. Latter's work, it was proposed by the Hon'ble President, seconded by Mr. J. R. Colvin, and resolved, that the Society do take five copies of Capt. Latter's Burmese Selections, and inform him that they regret the limited object of the Oriental Fund and the state of their own Funds prevent them from offering a larger encouragement to his work.

8th. From Capt. G. Siddons, 1st Cavalry, transmitting the continuation of his translation of the Vichitra Nátak.

9th. From Dr. Roer, communicating extracts from letters, received by him from Mr. F. Dummler, Berlin, Professor Böhtlingk, St.

Petersburgh, and B. Donn, Esq., Director of the Armenian Museum at St. Petersburgh. Referred to the Council.

10th. From T. B. Mactier, Esq., Offg. Joint Magistrate of Bancoorah, announcing the despatch of a meteoric stone, which fell at Bishṇupur on the evening of the 30th November last, and forwarding two depositions given by persons residing near the spot, and the result of his own enquiries on the subject.

Resolved, that the thanks of the Asiatic Society be conveyed to Mr. Mactier for the zeal he has evinced in forwarding the specimen to the Society.

The papers connected with the proposal, by Rev. K. M. Banerjee, for the publication of the Puráṇas were next brought forward, when it was resolved, proposed by J. R. Colvin, Esq., and seconded by Rev. W. Kay, that it be referred to the Council to arrange with the Rev. K. M. Banerjee as to the particular Puráṇa, the publication of which, with a translation, it may be most desirable to undertake in the first instance, having regard to the MS. translations of portions of the Puráṇas in the possession of the Society.

Mr. Piddington, by permission of the President, read a paper from the *Chinese Repertory* entitled, "Remarks on Showers of Sand in the Chinese plain," by Dr. J. MacGowan.

The Librarian and Zoological Curator having read their usual monthly reports the Meeting adjourned.

Confirmed. *March* 5, 1851.

J. Colvile, *President.*

Report of Curator, Zoological Department.

To the Secretary of the Asiatic Society of Bengal.

Sir,—I have only now to report the following donations:

1. From E. C. Bayley, Esq. C. S. an imperfect skin of the Fox of Tibet, described *J. A. S.*: XI, 589, and which I believe to be identical with *Vulpes ferrilatus*, Hodgson, *J. A. S.* XI, 289, and also with *V. nipalensis*, Gray, *Mag. Nat. Hist. n. s.* 1, 578, and probably also with *V. Hodgsonii*, Gray, *ibid.* (vide *J. A. S.* XI, 589, note); the species varying somewhat in colour both individually and with regard to season. In this case the name *Vulpes Hodgsonii*, Gray, must be adopted; for *nipalensis* is a misnomer. Its difference from the Himalayan *V. montanus* is much the same as that of the American *V. fulvus* from the European *V. vulgaris*; and the Afghan and Persian *V. flavescens*, Gray, is again very distinct from either.

2. From L. C. Stewart, Esq., H. M. A bottle of reptiles in spirits, collected in various parts of the upper provinces.

3. From Mr. Jas. Montieth. A portion of a log of toon-wood, having a large mass of decomposing granite imbedded in it.

E. BLYTH.

February 3rd, 1851.

LIBRARY.

The following books have been added to the library since the January meeting.

Presented.

Observations made at the Magnetical and Meteorological Observatory at Bombay for the year 1847.—BY C. W. MONTRIOU, Esq. Part I. Magnetical Observations, Bombay, 1850.—BY THE BOMBAY GOVERNMENT.

The Ancient Sculptured Monuments of the County of Angus. Edinburgh, 1848, Elephant folio.—BY DR. GEORGE BUIST.

Anglo-Hindustani Hand-Book, Calcutta, 1850, 12mo.—BY E. COLEBROOKE, Esq.

Lexicon Geographicum, cui titulus est مراصد الاطلاع على اسماء الامكنة و البقاع E Duobus Codicibus MSS. Arabicis editum. Duo exhibentem Literas Elif-Bá-ta. Ediderunt T. G. J. Juynboll et J. J. B. Gaal.—BY THE CURATORS OF THE ACADEMY OF LEYDEN.

Philosophical Transactions of the Royal Society of London, for the year 1850, part I.—BY THE ROYAL SOCIETY.

Proceedings of the Royal Society of London, Nos. 73—5.—BY THE SAME.

Transactions of the Royal Society of Edinburgh, Vol. XVI. Part IV.—BY THE SOCIETY.

Markestoun Meteorological Observations for 1844.—BY THE ROYAL SOCIETY OF EDINBURGH.

Proceedings of the Royal Society of Edinburgh.—BY THE SAME.

Zeitschrift der Deutschen Morgenländischen Gesellschaft, 4th Vol. Part II. III, and Vol. V. P. II. III.—BY THE GERMAN ORIENTAL SOCIETY.

Susrutas Ayurvedas. Id est Medicinæ Systema a venerabili D'hanvantari demonstratum a Susruta discipulo compositum nunc primum ex Sunskrita in Latinum vertit, Introductionem annotationes et rerum indicem adjecit, Dr. Franciscus Hessler, Tome II. 1847, 8vo.—ROYAL ACADEMY OF BAVARIA.

Gelehrte Anziegen, Nos. 24, 25, 28, 29.—BY THE SAME.

Bulletin der Koniglichen Akademie der Wissenschaften for 1847, (Nos. 1 and 7 wanting).—BY THE SAME.

Ueber den Antheil der Pharmacie an der Entwicklung der Chemie. Festrede zur Borfeier des Geburtstages seiner Majestat Maximilian II. Konig von Bayern gehalten in der offendlichen Sitzung der K. Adakemie der Wissenschaften am 27th November, 1849, von Dr. L. A. Buchner, Munchen, 1849, 4to. pamphlet.—By the same.

Uber den Entwicklungsgang des Griechischen und Romischen und des Gegenwärtigen Zustands des Deutschen Lebens. Von Ernst von Lasaulx. Munchen, 1847, 4to. pamphlet.—By the same.

Die Staatliche Entwicklung bei den Völkern der alten und neuen Zeit. von Georg Martin Thomas. Munchen 1849, 4to pamphlet.—By the same.

Almanach der koniglichen bayerischen Akademie der Wissenschaften fur das Jahr, 1849.—By the same.

Rudimenta Mythologiae Semitica et supplementa lexici Aramaici scripsit Paulus Boetticher. Berolni, 1848, Pamphlet.—By the same.

Journal of the Royal Geographical Society of London, Vol. XX. Pt. I.—By the Society.

Bulletin de la Société de Geographie. Troisième Serie, Tome XIII.—By the Society.

Quarterly Journal of the Geological Society, No. 23.—By the Society.

Journal Asiatique, Nos. 73-4.—By the Socie'te' Asiatique de Paris.

Report of the Calcutta Public Library, for 1850.—By the Curators of the Public Library.

Journal of the Indian Archipelago, Vol. IV. No. 12. Two Copies.—By the Government of Bengal.

Oriental Baptist, No. 70.—By the Editor.

Upadeshaka, No. 50.—By the Editor.

The Zenana Opened: or a Brahmin advocating Female Education (in Bengali).—By Ba'bu Ra'jendrala'l Mittra.

Calcutta Christian Observer, for February, 1851.—By the Editor.

Oriental Christian Spectator, for December, 1850.—By the Editor.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the month of Nov. 1850.—By the Deputy Surveyor General.

Miftáh ul Reshád. By Mohammad Masih-ud-dín Khán Báhádur. Persian, 8vo.—By Ra'ja' Ra'mchand Sing.

Ditto Ditto by the Author, through H. Torrens, Esq.

Dariá e Latáfat.—By the Same.

Jadával Talu-e-Gharúb by Mauluvi Mohammad Masih-ud-dín Khán Bahádur.—By the same.

Purchased.

Journal des Savants, for Oct. 1850.

Comptes Rendus, Nos. 17 @ 21.

Travels of Evilyá Effendi, Vol. II. Translated from the Turkish by Ritter Joseph von Hammer-Purgstall, Vol. II.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of February, 1851.

Date.	Observations made at Sun-rise.						Observations made at apparent noon.						Maximum Pressure observed at 9h. 50m.					
	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.
	Inches	°	°	°			Inches	°	°	°			Inches	°	°	°		
1	30.036	63.4	63.3	61.3	N.N.W.	Cirro-strati	30.135	69.2	70.8	65.3	N. W.	Clear	30.112	72.6	73.0	65.2	N.W.sp.	Cloudy
2S	.047	59.4	59.3	57.9	N. E.	Clear	.112	67.0	69.2	63.6	S. W.	Ditto	.072	72.4	74.0	64.8	W.S.W.	Cumuli
3	.100	61.2	61.5	60.3	N. N. E.	Ditto	.139	68.6	71.2	66.3	W.S.W.	Ditto	.067	75.0	76.5	66.9	W.	Ditto
4	.019	63.0	62.6	61.3	E. N. E.	Cirro-strati	.056	69.6	72.0	67.8	E. S. E.	Cirro-strati	29.987	75 0	76.5	67.6	S. W.	Cirro-strati
5	.017	62.3	62.5	60.5	E. N. E.	Clear	.051	71.3	74.4	66.2	S. E.	Clear	30.001	76.6	79.0	65.0	S. S. W.	Clear
6	.030	63.5	63.6	61.7	S. E.	Ditto	.084	70.8	73.6	67.0	E. N. E.	Ditto	.019	77 3	80.1	69.0	S. S. W.	Cumuli
7	.006	67.4	66.9	66.4	E. N. E.	Foggy	.041	71.4	75.0	62.0	S. E.	Cumulo-strati	29.973	79.0	81.4	73.4	S. S. W.	Cumulo-strati
8	.012	67.3	66.8	64 9	N. W.	Scattered-clouds	.047	70.1	70.9	67.0	W.N.W.	Clear	.973	75.3	76.4	69.2	N. E.	Cumuli
9S	.000	68.0	67.4	66.2	S. S. E.	Rain & thundg.	.042	71.6	74.0	67.8	S. W.	Cirro-cumuli	.990	76.5	78.5	68.7	N. W.	Cirro-cumuli
10	29.922	68.3	68.0	66.2	S. S. W.	Cirro-strati	29.980	72.6	74.4	70.2	S. S. W.	Cirro-strati	.934	78.0	80.0	71.2	S.	Cirro-strati
11	.849	67.6	67.3	66.1	S. S. E.	Cirro-cumuli	.896	73.5	75.0	72.0	S. S. W.	Cloudy	.835	76.7	77.7	73.5	S. S. W.	Cumulo-strat
12	.796	65.5	65.0	64.5	N. N. E.	Clear	.880	68.2	69.8	67.4	N. N. E.	Clear	.841	74.0	75.3	69.0	N.	Cirro-cumuli
13	.959	66.3	66.4	65.2	S. E.	Cirro-cumuli	30.039	72.3	75.0	68.8	E. S. E.	Cirro-cumuli	.989	77.4	79.3	68.0	E. S. E.	Ditto
14	.902	71.3	71.5	70.7	S.	Ditto	29.939	76.2	78.4	74.2	S.	Cloudy	.916	78.2	79.8	74.3	S. W.	Cloudy
15	.886	69.0	68.2	67.0	N. N. E.	Overcast	.959	69.3	69.7	67.8	N. E.	Ditto	.917	74.4	76.3	70.6	N. E.	Cirro-cumuli
16S	.929	67.7	68.0	66.8	N.N.W.	Scattered-clouds	30.000	71.7	73.0	65.7	N.	Cirro-cumuli	.993	75.0	76.3	66.8	N.	Ditto
17	.982	66.4	66.3	64.6	N.	Cirro-cumuli	.066	70.9	72.2	61.0	N.	Clear	30.024	75 5	76.6	63.2	N.	Clear
18	.999	63.7	62.6	58.4	N. N. E.	Clear	.062	70.3	72.3	62.9	N. E.	Ditto	.015	75.3	77.0	65.3	N. E.	Ditto
19	.927	68.5	68.3	66.7	E.	Scattered-clouds	29.983	73.0	75.0	69.7	S. S. E.	Cloudy	29.936	76.5	78.8	72.3	N. W.	Cumulo-strati
20	.960	63.6	63.6	61.4	N.	Clear	30.032	72.5	75.2	61.4	N. E.	Clear	30.002	77.0	78.6	62.5	N. W.	Clear
21	30.040	64.4	64.9	62.8	N. W.	Ditto	.101	72.6	75.2	67.3	W.N.W.	Ditto	.067	78.0	79.5	63.6	W.N.W.	Ditto
22	29.997	64.0	62.3	58.0	N. W.	Ditto	.033	69.2	71.6	62.6	N. W.	Ditto	29.968	76.4	78.0	61.2	N. W.	Ditto
23S	.892	62.8	62.7	60.3	S. E.	Ditto	29.944	70.5	73.0	64.6	E. N. E.	Ditto	.888	76.9	79.4	67.5	S. E.	Cumulo-strati
24	.924	66.2	65.8	63.0	E. N. E.	Ditto	.999	73.7	76.7	69.4	E. N. E.	Ditto	.958	79.3	81.5	67.6	E.	Ditto
25	.939	66.5	67.0	65.0	W.S.W.	Ditto	.998	74.2	77.0	69.6	N. E.	Ditto	.956	80.2	82.3	67.6	S. W.	Cumuli
26	.873	70.0	70.3	68.4	S. S. W.	Ditto	.925	77.4	80.2	70.9	S.	Ditto	.892	83.0	84.6	75.2	S.	Ditto
27	.840	71.3	71.0	69.6	S. W.	Ditto	.911	75.5	77.8	71.6	S. W.	Ditto	.864	81.2	83.3	68.2	W.S.W.	Clear
28	.850	73.8	74.0	72.8	S.	Cloudy	.925	78.3	80.4	75.3	S. W.	Cumulo-strati	30.000	83.3	85.3	75.4	S. S. W.	Cumuli
Mean	29.955	66.2	66.0	64.2	....	.....	30.014	72.9	74.8	67.3	....	.....	29.971	77.0	78.8	68.3	....	.....

[*Meteorological Register, continued.*]

Observations made at 2hs. 40m.						Minimum Pressure observed at 4 p. m.						Observations made at sun-set.						Maximum and Minimum Thermometer.			Max. Therm. in sun's rays.	Rain Gauges.		Moon's Phases	Date.
Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Max.	Mean.	Min.		Feet. 4. Upper.	Feet. 4. Lower.		
Inches	°	°	°			Inches	°	°	°			Inches	°	°	°			°	°	°	°	Inch.	Inch.		
30.019	72.2	73.8	65.2	N. E.	Cirro-strati	30.020	73.3	72.8	64.6	N.	Cirro-strati	30.044	71.6	70.4	63.3	N.	Cirro-strati	74.4	69.2	64.0	89.6	..	..	●	1
.006	76.8	77.3	65 0	w.s.w.	Cumuli	.008	76.9	76 3	65,0	S. W.	Clear	.027	74.3	72.8	65.2	W S W	Clear	78.0	68.8	59.6	94.6	..	..		2
29.986	78 5	78.9	66.9	W.	Ditto	29.989	78.8	78.3	66,6	W.	Ditto	.012	76,4	74.8	67.5	W S W	Ditto	80.0	70.8	61.5	97.0	..	..		3
.931	79.0	79.4	66.0	N. W.	Cirro-strati	.931	79.0	78,6	64,5	w.n.w.	Ditto	29.965	76.6	75.0	66.0	N. W.	Ditto	80,4	71.7	63.0	94.2	..	..		4
.936	80.0	81.6	67 0	S. W.	Clear	.941	80.4	80.0	66.0	w.n.w.	Ditto	.972	77.6	75.9	67.4	W.	Ditto	82,0	72.5	63.0	99.8	..	..		5
.944	81.5	82 5	70.9	S. W.	Cumuli	.937	82.0	82,2	70,3	S. W.	Cumuli	.946	80.0	79.0	70.3	S. E.	Cumuli	83,7	73.9	64.0	102,2	..	..		6
.904	83 7	84.4	72.3	S.	Ditto	.884	83.6	83.0	70,8	S.	Ditto	.909	80.3	79.0	70.6	S S W	Cy. to the N.W.	84.9	76.0	67.0	103,7	..	..		7
.913	79.0	80.7	72 4	N N E	Ditto	.925	78.4	78.0	70,5	N.	Scatd.-clouds	.935	75.0	74.0	68.6	N N E	Scatd.-clouds	81.4	74,3	67.2	97.6	0.09	0.11		8
.915	81.0	81.7	69.9	S. W.	Ditto	.895	81.5	81.0	68.2	W S W	Cumuli	.907	79.0	77.9	69.0	W S W	Cirro-strati	82,5	75.3	68.0	101.7	..	..	D	9
.927	81 5	82.0	72.3	S. W.	Cumulo-strati	.816	80.1	78.4	71,3	S S W	Cumulo-strati	.831	77.7	76.3	68.8	S.	Scatd.-clouds	83,1	75.8	68.4	99.6	0,05	0.08		10
.691	80.8	81.3	74.4	s. s. w.	Ditto	.754	71.4	67,6	65,8	N N E	Cloudy	.756	68.8	66.7	65.2	E S E	Cirro-cumuli	82,0	74,5	67.0	99.8	1.94	2.06		11
.772	78.2	79.2	71.2	N. N. E.	Cirro-cumuli	.785	79,1	78.9	70,2	N.	Clear	.816	76.6	75,6	69.8	N N W	Clear	80.0	72.7	65.3	98.9	..	..		12
.918	80.8	82.2	69.6	S. E.	Ditto	.901	82.2	82,2	69,6	S. E.	Cirro-cumuli	.898	80.0	79.2	70.6	S. E.	Ditto	82,5	74.5	66.4	107.0	..	..		13
.873	76.3	76.4	72.7	N. N. E.	Cloudy	.851	77.5	76.9	72,4	E.S.E.	Ditto	.850	75.6	74.4	71.3	E.S.E.	Scatd.-clouds	80.7	75.8	70.9	98.4	0.13	0.16		14
.856	75.7	77 0	70.4	N.	Cirro-cumuli	.857	77.4	76.8	69,8	E.	Cumulo-strati	.858	76.3	75.3	69.5	E.S.E	Cumulo-strati	78.2	73.4	68.6	101.3	..	..		15
.934	78.4	78.6	67.6	E. N. E.	Ditto	.922	78.6	78 0	67,7	N. E.	Cirro-cumuli	.924	76.8	75.6	68.7	E.N.E	Scatd.-clouds	79.4	73.4	67.4	99.5	..	..	⊙	16
.957	79 0	79.5	65.4	N.	Clear	.944	79.4	78,5	64,2	E N E	Clear	.959	76.6	74.8	65.3	E.S.E.	Clear	80.0	73,2	66.4	100 3	..	..		17
.919	79.0	79.3	67,3	E.S.E.	Ditto	.904	79.4	79.0	67,2	E.S.E	Ditto	.909	77.5	76.0	68.3	S.	Ditto	80.0	71.5	63.0	101 3	..	..		18
.849	80.4	81 6	72 3	w.s.w.	Cumulo-strati	.831	82.0	81.9	71,3	N. W.	Cumulo-strati	.848	79.3	78.0	70,4	W.	Ditto	82.5	75 5	68.4	96.8	..	..		19
.938	80 2	81.5	64.6	N. W.	Clear	.927	81.2	81,2	64,4	N. W.	Clear	.937	79.0	77.3	65.3	WSW	Ditto	82.0	73.0	64.0	100 0	..	..		20
.982	81.4	82,3	65.5	w.n.w.	Ditto	.969	82.0	82,3	64,2	w.n.w.	Ditto	.972	79.3	77 2	66.4	N. W.	Ditto	82,6	73.8	65.0	100.4	..	..		21
.864	79.4	80.0	62,8	w.n.w.	Ditto	.844	79.8	79.7	62,8	N. W.	Ditto	.842	77.0	74.8	64.5	N. W.	Ditto	80.6	71.6	62,5	95,0	..	..		22
.804	80.2	81.3	68.6	w.n.w.	Cumulo-strati	.800	81,2	81.4	68,4	W S W	Cumuli	.821	79,0	77.4	67.6	WSW	Ditto	82,6	72.8	63.0	104 5	..	..	☾	23
.869	82.6	83.4	68.0	S. E.	Ditto	.864	83,2	82.6	67,4	N N E	Cumulo-strati	.876	80 8	79.6	68.3	S. E.	Cumuli	84.3	75.4	66.4	105.6	..	..		24
.879	83.6	74.5	68 0	w.s.w.	Cumuli	.872	84.2	84.5	68,8	W S W	Clear	.883	82.2	80.5	68.8	S. W.	Clear	85.0	76.2	67.3	103,0	..	..		25
.811	85 3	85,2	75,6	S.	Ditto	.800	84.7	84.4	74,0	S.	Ditto	.812	81.7	80.3	73.4	S.	Ditto	86.5	78.5	70.5	100,6	..	..		26
.781	85.5	86 8	67.7	W.	Clear	.776	86 5	86.8	66.7	WS W	Ditto	.772	83 4	81.4	69.5	S. E.	Ditto	87.0	79,3	71.5	106,0	..	..		27
.808	87.6	88.4	73,0	S. W.	Cumuli	.798	88.4	88.9	70,3	S. W.	Cumuli	.806	86.0	84.6	75 3	S.S.W	Ditto	88.6	81,3	74.0	107.4	..	..		28
29,889	80,3	80,7	69.0	....	.....	29.884	80.4	80.0	68.0	....	.....	29.896	78.0	76.6	68.4	....	.....	82.0	74.1	66,2	100.2	2,21	2.41		

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On the Comparative action of the Marine and Aneroid Barometers and Simpiesometer in Cyclones.—*By* HENRY PIDDINGTON, *President of Marine Courts.*

The Aneroid Barometer has justly excited much interest amongst scientific and nautical men, and its performances on long voyages have been, I believe, generally well spoken of. Some registers of the comparative action of the Aneroid and Mercurial Barometers and Simpiesometer from England to Calcutta have been sent to me and the results are certainly most creditable to the new instrument.

Dr. Buist of Bombay has also published some interesting experiments on the performance of the Aneroid when carried to the Neat's Tongue, an elevation of 1000 feet, which are also most creditable to its performance.*

But the registers above alluded to are registers of fine weather voyages, with nothing more serious than one or two of the usual Westerly gales off the Cape, and in Dr. Buist's experiment the temperature, it will be recollected, decreased as well as the weight of the atmospheric column. We have as yet no published account, that I am acquainted with, of the comparative action of the Aneroid and Mercurial Barometers and Simpiesometer in great and sudden falls, at high temperatures.

* Simpiesometers are spoken of in the note, but we have only the comparison with the Barometers given.

Such falls varying from half an inch (0.50) to two and a half inches (2.50), or even more, we know occur in the Tropical Cyclones,* and in these the Thermometer is perhaps always between 75° and 80°; and, speaking of course theoretically, and from the diagrams of the instrument, it has always appeared to me questionable what the action of an Aneroid would be in one of our China Sea Tyfoons, or Bay of Bengal or Malabar Coast Hurricanes; that is, if it would equal the Simpiesometer, if it was even found to be as good as the Barometer as to *time*, in warning of the approach of the Cyclone? and again if its index would, at the height of the Cyclone, shew the same amount of diminished pressure? A few very simple experiments by the instrument-makers, or by Amateurs of physical research, who may have the necessary apparatus, would solve this doubt; but the instrument-makers are not likely to be desirous of checking the sale of a new and rapidly spreading article; and scientific men in Europe, unless they have attended to the subject, have little conception of what a singular and wonderful complication of meteorological phenomena a tropical Cyclone in all its terrific power presents.†

* I have given in the Sailor's Horn Book, p. 233, a table of excessive falls of the Barometer in Cyclones comprising fourteen well attested instances of falls from 2.70 to 1.50.

† *Ex. gr.* In the *Elements de Physique Experimentale et de Meteorologie* of Pouillet, fifth edition (1847) Vol. I. p. 142, we are gravely told that "Des 1690, le Pére De Beze avait reconnu qu'a Pondichéry et á Batavia le barométre reste immobile, quelles que soient les tempêtes que l'on eprouve: Legentil avait confirmé ces observations; et maintenant il est bien démontré que, dans toute la zone équatoriale, le barométre est en effet insensible aux secousses atmosphériques, mais qu' il eprouve cependant des variations périodiques et régulieres, que l'on appelle variations horaires."

As early as 1690 Father De Beze had found that at Pondicherry and at Batavia the Barometer remains unaffected whatever tempest be felt. Le Gentil had confirmed these observations, and it is now well demonstrated that throughout the equatorial zone *the Barometer is really insensible to violent atmospheric disturbances* (secousses) but that it experiences regular and periodic variations which are called hourly variations." M. Pouillet's name is, as most of my readers may know, next only to that of MM. Arago and Biot as a Professor of Physics; and his work is the standard one in the University of Paris!

I have found then with great satisfaction an instance in which the Aneroid, Mercurial Barometer and Simpiesometer have been carefully registered in a Cyclone, though not one of the very severest class, and moreover one in which the fall of the Barometer was trifling as compared with many of which we have full details. Nevertheless as the first instance of the kind on record, and with the hope of leading public attention to this very important scientific question—for the great portability and convenience of the Aneroid are very tempting advantages to induce many seamen who can ill afford money or room for a multiplicity of instruments, to substitute it wholly for the Barometer and Simpiesometer,—I have thought it useful that the details should be published.

This instance has been furnished to me by Mr. Branch Pilot S. Ransom of the H. C. Pilot *Brig Tavoy*, which he commanded in the April Cyclone of 1850, and it will be sufficient to state here that the Cyclone was one which has been traced from near the Nicobar Islands to Moorshedabad, a distance of 1,000 miles.

Its centre passed at about 2 A. M. of the 27th April about 60 miles to the West of the *Tavoy*, which vessel was then cruising at the Pilot Station and had put to sea to get an offing. Mr. Ransom has given a very full series of observations of which the result for 36 hours will be seen by the following tables to which I have interpolated the differences: the principal results being given first, to save room, and Mr. Ransom's detailed table last.

The principal results are as follow.

26th April, 1850,	*Mar: Bar.*	*Diff.*	*Aneroid.*	*Diff.*	*Simp.*	*Diff.*
At 2 A. M.	29.77		29.94		30.05	
		— 0.14		— 0.16		— 0.35
2 P. M.	29.63		29.78		29.70	
		— 0.26		— 0.25		— 0.25
27th April, 2 A. M.	29.37		29.53		29.45	
		+ 0.33		+ 0.32		+ 0.34
2 P. M.	29.70		29.85		29.79	

Table of Barometrical, Aneroid, Simpiesometer and Thermometer observations on board the H. C. P. V. TAVOY. *Commanded by Mr.* S. RANSOM, B. P. *Civil Time.**

Date.	*Time.*	*Ther.*	*Mar: Bar.*	*Diff.*	*Aneroid.*	*Diff.*	*Simp.*	*Diff.*	*Wind.*	*Weather.*	*Aspect.*
Tuesday, 26th April, 1850.	2 A. M.	82°	29.77		29.94		30.05		Strong N. E.	Squally.	Dense clouds.
				—07		—07		—00			
	4	82°	.70		.87		.05				
				+05		+02		—11			
	8	84°	.75		.89		29.94		———	Blowing and rain.	Clouds
				—12		—11		—24			
	2 P. M.	82°	.63		.78		.70		Calm.	....	Dense cloudy.
				—02		—02		—05			
	4	82°	.61		.76		.65				
				+04		+02		+01			
	6	82°	.65		.78		.66		East gale.		
				—08		—13		—10			
	8	82°	.57		.65		.56		East gale.		
27th April.				—16		—06		—06			
	1 A. M	80°	29.41		29.59		29.50		E. to S.E	Squally Hurricane.	Fierce indeed.
				—04		—06		—05			
	2		.37		.53		.45				
				—00		—02		— 1			
	3.30		.37		.51		.44				
				+13		+06		+06			
	5		.40		.57		.50				
				+10		+09		+10			
	6.20		.50		.66		.60				
				+14		+03		+04			
	7	81°	.54		.69		.64				
				+05		+09		+11			
	8	81°	.59		.78		.75		S. S. E.	Hurricane.	
				+09		+04		+04			
	10 A.M.	82°	.68		.82		.79		South.		
				+02		+03		——			
	2 P. M.	82°	.70		.85		.79		S.S.W.S.	Moderate	
				+10		+06		+04			
	8	82°	.80		.91		.83		S. S. W.	Fine weather.	

The lowest depression was at 3.30 A. M. on the 27th April, when the instruments stood as follows:

Mar: Bar.	*Aneroid.*	*Simpiesometer.*
29.37	29.51	29.44

* The Tavoy's Aneroid is supplied by Government and of course from the best maker: I believe from Messrs. Dent and Co.

Hence it will be seen that the Simpiesometer had about double the fall in the first 12 hours on the approach of the Cyclone, and that the entire fall of the instruments was, for 25½ hours, or from the first fall up to the passage of the centre, as follows:

Mar. Bar.	*Aneroid.*	*Simpiesometer.*
0.40	0.43	0.61

The Simpiesometer giving *one third* more fall than the Marine Barometer and Aneroid. Throughout this Cyclone the Thermometer varied only 4°; being at 84° at 8 A. M. on the 26th, and at 80° from 1 A. M. to 6.20 A. M. on the 27th. The above table is projected on the plate, which is drawn to a vertical scale of 2 inches for one.

Cases of very severe Cyclones have occurred, especially in the Southern Indian Ocean, in which the fall of the Barometer has been so insignificant as wholly to mislead the seaman, but the Simpiesometer has both shewn a greater depression and shewn this *in time* to put him on his guard. Notable instances of this are the Cyclones of the *Buccleugh* and of the *Vellore;* the last investigated by Dr. Thom. In the *Buccleugh's* Cyclone though of terrific violence (See Sailor's Horn Book, p. 232, 2nd Edition) the Barometer did not fall below 29.76 on its approach: but the Simpiesometer had been 0.38 lower for a week previous, and fell 0.82 lower than the Barometer during the Cyclone.

But it will be remarked of the *Tavoy's* table just given, that after the depression of the first twelve hours, or say from *a* to *b* on the plate, and on the rise after the greatest depression, the instruments shewed nearly the same differences; and I have said above that I was speaking theoretically of the probable action of the Aneroid as regards *time* of warning, which for the Mariner is the one thing needful. This I will now endeavour to explain, and those who have considered the subject of Barometers philosophically will agree I think with me that the result here detailed goes far to justify one of the two theoretical objections which the construction of the Aneroid suggests; and which strange to say, has never been adverted to by the inventor or sellers, that I am aware of. And it is this. We are told a good deal of temperature, but they seem to have taken no notice of another great principle in physics, INERTIA, and to this I attribute at once the superiority of the Simpiesometer.

That Inertia is every where present and must always be first overcome, no one acquainted with the laws of physics will question, as also that it resists motion at all times, and on the minutest as well as on the largest scale. Now considering first the common Marine Barometer (the sluggish Barometer as Mr. Dent* somewhat unfairly terms it), we have here, the Inertia of the column of mercury and its attraction of cohesion, and then—and in dry weather and with badly prepared leather, this may not be trifling, the Inertia (want of elasticity) of the leathern bag in which the mercury is inclosed in the box, or of the leathern bottom to it, to overcome, before a minute atmospherical variation can affect the column. Our practice of gently tapping the Barometer before reading off is the familiar recognition of the existence of all these obstacles to the free motion of the mercury.

In the Aneroid we have the Inertia of the plate covering the vacuum vase, and then the Inertia and friction of a train of machinery levers, &c. to overcome before we move the hands; and when we recollect that, even with the powerful spring of an eight-day Chronometer, the balance must, in sailor language, "get a start" by the semi-circular motion which must be given to it to set it going when it has been wound up after being let down, as every one who understands the management of Chronometers is aware, we can form some idea of what the Inertia and friction of the machinery of the Aneroid, trifling though it be, amounts to.

In the Simpiesometer we have only the Inertia and attraction of cohesion of the small column of oil, or acid† to overcome; the whole of which probably does not exceed that of an inch of the Barometric column; for, as the atmosphere acts directly upon the surface of the liquid in the curved tube, all that Inertia which arises from the greater or less flexibility of the leathern bag, and the great weight of the mercurial column being avoided. In the fixed standard Barometers this direct action upon the surface of the mercury is also allowed to take place, but the weight of the column still remains. There may

* Treatise on the Aneroid.

† Some Simpiesometers are said to be filled with an acid, but it is difficult to imagine what kind of acid would not either evaporate or absorb water, unless as I suppose, the top is covered with oil.

be an infinitesimal Inertia in the atoms of the gas of the Simpiesometer but this must be to a very small amount, and exists also in the Aneroid.

We can thus readily conceive why the Simpiesometer should be theoretically the most sensitive instrument. It must have less Inertia and friction to overcome, than the most delicately made Aneroid, in which, however well constructed, there must be, according to the drawing, 6 pivots, 1 bow-piece, 2 springs, 2 fulcra, 2 rods, 1 chain, 1 roller, 1 collar, 2 levers, and the condensing box-cover to move, or rather (for the sailor's term is the most expressive here) to "give a start to"* before motion takes place; and all these have their Inertia, friction and some also an attraction of cohesion, however small it be, ready to resist a minute atmospheric change, especially after any repose.

The fact that the instrument acts as well or better than the Barometer during gradual changes, or when carried to the top of a house or hill, seems to me also strongly to confirm this theory (for I beg it may be taken as yet for nothing else), that it is the difference of Inertia which will always render the Simpiesometer the most trust-worthy instrument for a *timely* indication of a change. For we must recollect that the Inertia of every machine apparently increases with the time of perfect rest, because, it is supposed, a small amount of cohesion takes place. Now when the Aneroid or Barometer are moved from their places, whether to be carried up stairs only, or to the top of a mountain, they are, however carefully handled, jarred sufficiently for the mere vibration of the parts of the Aneroid and the motion of the mercury to overcome that portion of their Inertia which depends on cohesion; and even if we suppose that the instruments could be moved without any vibration or motion of the mercury, which is impossible, there is still the change of temperature, which is quite sufficient to destroy the minute cohesion of which we are speaking, and diminish

* If a billiard ball be placed upon a table it may be moved (started) by the smallest feather. If an 18 pound shot replace the billiard ball, a strong quill will bend before the shot is started. This is, for Sailors, a familiar illustration of Inertia. If the ball or the shot be left for some hours it will if measured by instruments be found that a slight additional force is required to move it, because some cohesion has taken place. If a bolt or pin be passed through the balls, and they are suspended like the sheave of a block, they will then oppose both their Inertia and the friction of their pivots to the power which puts them in motion.

the Inertia. Perhaps if the Aneroid had been gently tapped with a fillip of the finger it might have shewn a greater fall. If it did not do so, then the difference of pressure was so gradual that it could not overcome the Inertia and friction. It is true that the motion of the vessel must have disturbed or done away with the Inertia of the Barometric column, but that of the leathern bag, or its inflexibility rather, still remains.

And thus we arrive at what I set out with, viz. that in a great change of atmospheric pressure, *without* much if any change of temperature, the Simpiesometer would be found the most sensitive instrument as regards time. In this case though not an extreme one it has been so found, and I have endeavoured to assign a reason for it. We must wait to see if other instances will confirm or modify these views.

I do not consider this instance the less valid that it was one of those in which the Barometer failed to give very timely warning, (though enough for every vigilant seaman when the other premonitory signs of the weather were taken into account), and was moreover one in which the total depression of the instruments was very small. It is exactly in cases like this that the seaman, and especially if in a short-handed merchantman, requires the aid of the most sensitive of the forewarning instruments, the instrument warning him to watch the weather, and the weather sending him to look at his instrument. For the present the Aneroid has not at all justified Mr. Dent's anticipation (p. 32 of his treatise on the Aneroid) of its "responding in a moment to the influence of atmospheric pressure." The Sailors will think also with me that it will be some little time before we shall have a chance of seeing Mr. Dent's exemplification of the convenience of the Aneroid verified, which I copy here as an amusing instance of the facility with which men may be led by their desire to recommend a new and favourite instrument to advance confidently what is in effect a sheer nonsensical puff.

"As an exemplification, it may not be amiss to lay before the nautical man the case of his being, while in his cabin, made sensible, by means of the Aneroid, of a sudden change likely to take place in the atmosphere. An important alteration might be immediately necessary in the adjustment of sails, &c., which, by the timely information afforded him through the Aneroid, he would at once have accomplished, long before the common *Marine* Barometer had even signified the

coming change. Instead of being obliged to proceed backwards and forwards from the deck to his cabin to consult the *Mercurial* Barometer, he remains on deck with the Aneroid in his hand, and is immediately certified of every atmospheric variation while he is issuing orders to the ship's company. A result more desirable than that which is here supposed, cannot, perhaps, be easily contemplated; and yet it is one which, it is confidently asserted, the new instrument in question cannot fail to produce."

It is much to be regretted that this error is now-a-days too common of exalting the imagined or anticipated virtues of an invention so far that the actual results may bring useful instruments into discredit. The Aneroid is, like the first Chronometer, but a first step in instruments of that class, and we shall doubtless soon see trials in which mechanical ingenuity will simplify and perhaps overcome many of the present difficulties. I need not add that I have no prejudice, as I can have no possible interest in any way but to serve the cause of the Sailor, who may be too hastily led to pin his faith to the new invention in preference to the Simpiesometer, which is now a standard instrument; and the very defect which it has been charged with, that of being so sensitive that it disquiets a commander of a ship needlessly, is in truth a perfection when its uses are properly understood.

A Comparative Essay on the Ancient Geography of India.

[This fragment was written by Col. Wilford about forty years ago, and by him fairly copied, and deposited in the Asiatic Society's Library. It is now published at the request of some members, and in the hope, that, though much has been of late done towards illustrating the Comparative Geography of India, the conjectures, and even the errors and fallacies of such a man as Col. Wilford will not prove uninteresting to the reader.—Ed.]

The oldest name of India, that we know of, is COLAR, which prevailed till the arrival of the followers of Brahmá, and is still preserved by the numerous tribes of Aborigines, living among woods, and mountains. These Aborigines are called in the peninsula to this day, *coláris* and *colairs;* and in the north of India *coles, coils,* and *coolies;* thus it seems, that the radical name is *cóla*. This appellation of *colar* was not unknown to the ancients; for the younger Plutarch says, that a certain person called *Ganges,* was the son of the *Indus* and of *Dio-Pithusa,* a *Calaurian* damsel, who through grief, threw himself into

the river *Chliarus*, which after him, was called Ganges; and *Chliarus* is probably a mistake for *Calaurius*, or the Colarian river.

I believe, that *Dio-Pithus* is the name of the father and *Sindhu* of the mother: for *Deva-Pi't'hu*, or *Deo-Pithu* is worshipped to this day on the banks of the *Sindhú*, a female deity. The etymology of *Colar* is probably out of our reach: but it is asserted by some that *Cola*, *Coil*, or *Cail*, signify a woodlander, exactly like *C'hael*, *Gál*, in Great Britain; and the etymological process is the same. In several dialects of the peninsula *Cádu*, is a forest, and its derivative is *Cádil*; from which, striking off the d, remains *Cail*. *Coed*, *Guedh* in Welsh, *Coet* in Galic is a forest, and from them come *Guidhil*, and Gathel, Guylh, *Coil*, *Gael*, and *Cael*.

This etymology is certainly curious; but as they call themselves *Coles*, Coils, or Cails, the origin of that name is to be sought for in their own language, which does not, as far as my enquiries go, admit of such a derivative.

The followers of Brahmá and Buddha, call India *Bhárata*, from an antidiluvian prince. It is according to the Mahá-bhárata of a triangular figure.* Its base rests upon the snowy mountains, and Cape Comorin is its summit. This equilateral triangle is divided into four other triangles equilateral also, and of equal dimensions. There are three in the north, and the one in the south represents the peninsula. The three triangles in the north, meet exactly in the middle of the basis of the larger one, upon the banks of the river *Drishadvatí*, a little to the N. W. of *Sthán'e-svara*, or Than'eh-sur, according to a very curious passage from the commentaries on the Vedas, communicated to me by Mr. Colebrooke. These four triangles, with the four grand divisions of India, which they represent, are denominated from their respective situation. Thus we have the middle country, the N. E., and N. W. quarters, with *Dacshiṇa-patha*, in the spoken dialects Dakkin-páth, or the southern paths; from which the Greeks made Dac'hinabadés; for, says Arrian, Dac'hanos in Hindi, signifies the south. This division, now totally disregarded, was adopted by Nonnus in his Dionysiacs, and also by Euhemerus, who was contemporary with Alexander, and was patronised by Cassander king of Macedon. The latter has omitted the middle country, without any impropriety, as it is of

* Section of Bhishma-parva.

small extent, and was in general parcelled out, among the three other divisions. Three of these divisions, had also other names; the N. E. quarter is styled *Anu-Gañgam*, or along the Ganges: the N. W. was called *Sindhú-de'sa*, or country of Sindhú, or Sind: the peninsula or *Dacshiṇapat'h*, is denominated *Caliñga*, or maritime country: and it was known to the Greeks under that name; for Ælian says, that, as the elephants of Taprobane were superior to others, the kings of the *Caliñgas* procured them from that island. Euhemerus does not use the word *Caliñga*, but calls its inhabitants *Oceanitæ*, which implies the same thing.

To the country along the banks of the Ganges, he gives the name of *Doia*; at least he calls its inhabitants *Doians*, from *Dhúh* the name of the Ganges, from Rájmahl to Ḍhácá, and the sea. The country along the Indus, he calls *Panchæa*, from the ever famous *Pinga'sa*, or *Pinga*, who lived in that country, and with all his followers emigrated, beyond the western sea, between India and Africa; and settled on the banks of the river *Crishná*, *Syámá*, or the Nile. The Paurániçs, instead of *emigrated*, say that he *transmigrated* there, with those who were attached to him.

The denomination of Bhárata is used only by learned men, and even seldom; and it is of course unknown to foreigners, who bestowed upon the whole continent of India, the name of that part of it nearest to them. Thus in Tartary, it is called *Anu-Gañgam*, or *Anonkhenkh*: in the west it was called *Sind*, *Hind*, India from the country of *Sindhu*, on the river of the same name. In Pegu, Ava, Sumatra it is called *Caliñga*, from the peninsula, which they frequented most. In the countries of Láhdaca, *Dsábád'am*, or Dsaprong, India is called ZAC; but whether it meant originally all India, or only part of it, is uncertain. According to this three-fold division of India, I shall divide my Essay into three parts, and begin with *Caliñga*. Pausanias mentions three large islands, or countries bordering upon the sea, in the remote parts of the Erythræan Ocean. Their names were *Séria Sacaia*, and *Abasa*, or *Abasan*. The first is obviously China, still called the kingdom of *Ser* in Tibet. *Sacaia* for *Záceya*, or the country of *Zác* is Indostan: and *Abasa* is the *Bhaisa*, or *Bhainsa*, or Buffalo country on the banks of the Indus: I am not well prepared to discuss this point at present, being but very lately acquainted with the subject.

ZAC to be pronounced *Zauk*, is an ancient hero, who according to tradition was inimical to the followers of Brahmá, when they came to India; for they unanimously acknowledge, that they are not natives of this country, and that they came from the N. W. He is of course considered as a Daitya, or evil spirit by them: and *Zác*, or *Zaco* is the devil all over the western parts of India, as far as Ceylon. In the month of January, in the year 1809, I saw a statue of his, between *Furreh*, and *Ach'hanerá*, and about ten cos S. by W. of Muttra. It might have been originally about fifteen feet high, but it is now broken to pieces. It is still an object of worship among some low tribes, who call him *Zác-Bábá*, or ZAC our lord, and father. He is the same with *Máhis'a-pati*, or lord of the Buffalo tribe, called in the Puráṇas Mahisásura; and who resided at *Nausha-pura*, according to the Bhuvana-Ságara, and the Dionysiopolis, or Nagara of Ptolemy, towards Cabul. He worshipped gods different from those of the followers of Brahmá, whom he opposed, and was defeated near Cabul. He fled toward the Indus, where he was put to death, near the rock called *Yulluleah*, where they show the place where his tomb stood formerly. According to the natives, he was a shepherd called *Yulluleah*, from the Sanscrit *Luláya*, another name for *Mahisásura*: and this story is related by the younger Plutarch who calls him *Lilaios*.*

In Sanskrit he is also called *Rhambha* and in the Dekkin *Erumai* is a Buffalo and *Heramba* is another name of his. He was the grandson of the famous Bali, who resided at Baroche; and was emperor of India. He was also an incarnation of Siva, and his father *Rambha*, or *Vánu* reigned on the banks of the Indus, according to the Paurán'icas. There we must look for the country of the *Erembi*, or *Arimi*, where lived Typhœus, and there was the rock of Typhon, who is represented riding upon an ass, which was also his symbol, for *Mahisa* is also the name of the *Cásara*, or wild ass. From Mahis'a comes *Bhaisa* or *Bhainsa*, in the spoken dialects, and *Bhaisonh* in the plural. The Greek and Latin name Bis'on for a Buffalo claims the same origin. In the north, and N. W. of India, this animal is called Zac, and Yác; which, in some dialect, there, is restricted to the *Saurya-gábhí*: and I suspect that the countries of *Sacai*, and *Abasan* are the same. The above passage from the Bhuvana-Ságara is noticed by Sig. Bayer, and others

* Plutarch de Flumin. voce Indus.

after him, as Bryant, &c. Lula'ya the chief of the Buffalo tribe or Mahis'a-pati was succeeded by another incarnation of Siva, with the title of Gapati, or the lord of the cow tribe, who introduced the *Bos*, or cow into India: for there were none before. Buffaloes were the only cattle: and the followers of Brahmá, having thus brought the cow, and introduced her into this country, they assumed the title of *Go-vaṇsas*, or the offspring of the cow, which they call their mother. Siva, and his incarnations, or *avatáras*, are styled *Bhagwan*, Bacchon, or Bacchus: and the *Mahis'a-pati*, and *Gopati* are of course entitled to that epithet: the former is Bacchus *Tacchos*, and the other Bacchus *Tauromorphos*.

Nausha-puri, called in the Bhuvana-Ságara, in the Támuli dialect *Nishádáburam*, or the town of *Nisha*, is the Nysa of the Greeks, near mount Meros, now Mar-coh. *Luldya* was defeated close to Cabul, by the *Gopati*, with the assistance of Deví, with the title of Ásá, or she who grants us the object of our wishes. She is also called Jayá deví, or the goddess of victory, and her *sthán* is still resorted to, by devout people. Alexander recognized Pallas in her, and worshipped her: and *Nicaia*, or *Nicæa*, or the place of the goddess of victory, is a translation of *Jayá-deví* in Hindi.*

Mahisa or Luláya was once for a considerable time the supreme monarch of heaven and earth, and set upon mount Olympus in the room of Indra, styled *Juh-pati*, that is to say the lord of heaven, or Jupiter. The case is this: our divine ancestor *Twash'tá*, styled *Deva*, or God by the Paurániçs, had been intrusted with the five elements; out of which, he made *Man*, *manushya*, or Mannus, and all the *murtis* or embodied forms. *Indra*, or Jupiter, in a fit of ill humour, killed his son *Visva-rupa*, in whom was concentrated the threefold energy of the world. *Twash'tá* meditated vengeance; and for this purpose lighted the sacred fire, with that element, which he extracted from water, through a curious, and most difficult process. In the mean time *Indra* alarmed, fled towards the north, and concealed himself. Twash'tá appointed *Mahis'a* in his room, and he would still be *Juh-pati*, or Ju-piter even to this day, but for a most singular accident. Twash'tá, whilst repeating sacred spells, placed the emphatical, or

* Asiatic Researches, Vol. vi. p. 495.

secondary accent on the wrong word; and thus blasted his own scheme; Indra resumed the Olympian throne; Mahis'a was defeated, and lost his life. As, in the present case, the idiom of the Sanskrita, and Latin languages, coincide, at least in the poetical dialect, I shall illustrate this passage in the latter. Twash'tá said *Indr inimicum auge;* and I write it, as it would have been pronounced in poetry, with the usual elision. Now this sentence is susceptible of two meanings: it may be either *Indræ inimicum auge*, or *Indram inimicum auge*. In the first case, the emphatical accent is obviously to be placed on the word *inimicum*, requesting the gods to increase, and enlarge the power and strength of the *enemy* of Indra. This Twash'tá wanted to say: but he was so much agitated, that he placed the accent upon the word *Indr'*: then the phrase became *Indram inimicum auge*, or give strength, and increase to *Indra* my enemy: for the emphatical accent, in no language whatever, can be placed upon a word in regimine.

This is the Bacchus, whose companions were styled *Cabali*, by the Greeks: for the army of *Mahis'a* consisted of many myriads of *Gopálas*, or shepherds, called in the Tamuli dialect, in which the Bhuvanaságara is written, *Cobáler* in the plural, from the singular *Cobála*. As an *avatára*, incarnation, or embodied form of Siva, *Mahis'a* certainly was inferior to none: he was besides a most religious prince, and beloved by every body. We may then naturally ask, how it happened, that he was destroyed by his own prototype *Siva*. This is explained in the following manner, by learned divines. After certain revolutions, religion with the creed, and its various rites, must undergo certain modifications, and even alterations. *Mahis'a* was a follower of the old religion, which he had been even sent to protect for a certain time, When a modification, and an alteration in religion was going to take place, we might suppose, that this divine *incarnation* would readily submit, or otherwise, be recalled: but this is by no means the case: for all these embodied forms of the deity, being obviously under the influence of *máyá*, or worldly illusion, will never submit, or deviate in the least from the object of their mission; though now no longer necessary. In this case, they are to be destroyed, with all their adherents: when the embodied form rejoins its prototype, who bestows heavenly bliss on his slaughtered followers, in his own heaven. But this subject I shall resume in my Essay on the countries bordering upon the Indus.

PART THE FIRST.

Of Calinga or the Sea Coasts from Cape Múdán to Chátganh.

Section I.—*Of the Sea Coast about the mouths of the Indus.*

The Sea Coast, or Calinga, of India, is divided into three parts, emphatically called *Tri-Caliñga*, or the three shores. The first *Caliñga* includes the Sea Coast about the mouths of the Indus: the second extends all round the peninsula: and the gangetic shores, from Cuttack to Chátganh, constitute the third. No emperor in India, could pretend to celebrity, and lasting fame, unless he was master of these three shores; when he assumed the title of *Tri-Caliñgádhipatí*, the lord paramount of *Tri-Caliñga*. There were three competitors to that title, the *Mahárájá* on the banks of the Ganges, the *Ballála* in the peninsula, and the *Bala-rájás* near Gujjarát. Their most formidable opponents to supremacy, were the proud *Gurjaras*, and those of *Utcala* now Orissa. The latter are said, in the inscription upon a pillar near Buddál, to have been eradicated; and that the king of Gour enjoyed their country.* They are of course much fallen off, with regard to civilisation. With a few exceptions in some places, they are a rude, and wild race, which have even forgotten the use of salt: for in India such tribes, as do not use it, are considered as barbarians, little remote from the brute creation.

The first *Caliñga* is about the mouths of the Indus; and we know but little of it. Some sketches, and delineations of the coast, have appeared occasionally; but they afford but little information, as they materially differ from one another, and are often contradictory. The natives of that country seldom travel, and merchants have little inducement to visit it: but near Cape *Múdán*, there is a famous place of worship called *Hiñgláj*, resorted to from all parts of India, by devout pilgrims. These are numerous indeed, and I shall lay before the Society, the result of the compared accounts of the most intelligent among them. Besides pilgrims, I never saw but one person, who had visited that country: he lived at Tha't't'há in a public capacity for seven or eight years, and left it very near fifty years ago. The account of the pilgrims is, as may be supposed, intermixed with many legen-

* Asiatic Researches, Vol. 1st.

dary tales, which, though fulsome, and ridiculous, are nevertheless so much connected with the geography, and history of the country, and they throw so much light on many particulars, that I have found it necessary, to give occasionally some short abstracts of the most interesting.

The country of Cutch, in Sanskrita *Cach'ha*, and also *Cunti*, is the rendezvous of pilgrims going to Hiñgláj. Those, who come from the N. E. follow nearly the course of the river Paddar: the greatest number from the East and S. E. are obliged to cross the gulf of *Cach'ha*, which is done at two places. The first is to the eastward of *Dwáracá*, at a place called *Rain* in the maps. If the wind be favourable, they cross directly to *Máscá-Mun'di*, in an island at the mouth of a river, and near *Chigu-Mun'di*, on the mainland. Should the wind be unfavourable, as when blowing from the W. or S. W., they then go, and land at *Anjár*, and the distance is 24 cos: but this is reckoned a dangerous passage.

Pilgrims coming from Cambay, and having no business at *Dwáracá*, go to a place called *Morví*, through *Drángdhárá*, and *Halwá'd'h*; thence to *Amronh*, where they embark, and sometimes go to *Anjár*; but more generally land at *Rávená'd'h*, *Rávená'd'hán*, or *Návenár* in the maps, and the distance is reckoned 27 cos.

From *Rávená'd'h* they travel N. W. to Bhoj the capital of the country, and 12 cos from the former place.

Those who land at *Anjár*, go along the shore to *Mo'drár*, or *Mun-'drár*, *Rávená'd'h*, and *Mascá-Mun'di*, or *Mudí*. From this place to Bhoj they reckon 12 cos, in a northerly direction. It is a considerable town with a strong fort.

Before I proceed with our pilgrim's route, I shall sketch out its grand outlines, and ascertain the situation of some of the most remarkable places. From *Mascá-Mu'dí* to *Bhoj* 12 cos, or 22 British miles; bearing north, or nearly so. From *Bhoj* to *Asápurí* 26 cos, or 49 miles: but from *Mascá* they reckon only 24 cos, or 45 miles. From *Asápurí* to *Ghai'deh*, near the mouth of the eastern branch of the Indus 27 cos, or 51 British miles. From *Ghai'deh* to *Tathá*, or Sháh-bandar 37 cos, or 70 miles: but as you cross the main stream of the Indus three times, a considerable allowance is to be made, for the windings of the road; and I allow 62 miles. From Sháh-bandar to *Rám-bág*, or *Crá-*

chi, they reckon in general 40 cos; but more correctly only 38, or 69 miles: a considerable allowance is to be made also here, and I allow 64 miles.

From *Rám-bág*, to *Hiñgláj*, they reckon in round numbers 80 cos; but there are only 78, or according to some 79. From *Rám-bág* to *Sonemé-yáni* 28 cos, from the western side of the bay of *Crách*, or 29 from the eastern.

From Sónéméyáni to *Hiñgláj* 50 cos; some reckon 54, which difference is explained in this manner: from Sónéméyáni you cross in a boat to the opposite side of the bay, and the distance is three cos, when the wind is favourable: but when it is not, you must take a circuit, through the bay, of seven cos, instead of three, and this accounts for the difference: but 50 cos is the true distance.

From Sónéméyáni to the river *Haur* or *Tomerus* they reckon 44 cos, or 81 British miles, and hence to *Hiñgláj* 6 cos, or 11 miles.

From *Bhoj* they travel westward; first to *Mancüáh* three cos; then for seven cos the road is through thickets of underwood, here and there, and numerous detached hummocks; the hills are to the right. You then enter a more agreeable and fertile country, and after travelling eight cos, you come to *Teherá*, a considerable town: and after eight cos more, comes the *sthán* of *Asápurí-Dévi*, a famous place of worship, to the westward of which is a pretty large stream, the eastern-most branch of the Indus; and about three or four cos from the sea, where, at the confluence, is also a place of worship. Near *Asápurí* to the N. E. is a famous pool called *Checherá*, or *Zhejherá*, which communicates under ground with Hiñgláj, and other holy places. There is another pool of that name to the west of Dehlí, and called *Zizerus* by the Greeks. In the compound *Asápurí*, *purí* does not signify a town, as I thought at first; but the whole implies, that this goddess grants to us the completion *pura*, of our wishes *Asá*. She is worshipped there under the title of *Vicháyaní-mátá-jananí-devi*, or the fostering goddess our mother, and author of our existence. This place is not the same, with the *Asápurí* of the maps, on the sea shore.

Those who land at *Mascá-Mun'dí*, and who do not choose to go to *Bhoj*, go to *Asápurí* on the sea shore: thence to *Náliyá-Co'thorá*, a small town; thence to *Behrá*, and to *Tehará*. In the route of a pilgrim from *Bhoj* to *Tehará*, he mentions *Mána-cüáh*, *Náliyá-Co'thorá*,

Bherá and *Tehará ;* but the distances are omitted. The western extremity of the ridge of mountains in *Cach'ha*, is to the N. E. of *Asá-purí ;* distance about eight, or ten cos, and probably to the north of *Tehará.*

After crossing the river to the west of *Asá-purí*, there is a high beach along the sea shore, level all the way, considerably higher than the adjacent country. It consists of hard sand ; its breadth, which is considerable in many places, is very irregular ; and the whole is covered with a shrub-like plant called *Luní* in that country, and *Jhau* on the banks of the Ganges.* Six cos from the river of *Asá-purí*, is a small reservoir under an Indian fig tree, and sometimes there are a few wretched huts : hence to another arm of the Indus five cos : it is navigable, and a short cos beyond, is the town of *Lác'h-pat-bandar*, or the port of Lác'h-pati the grandfather of the present Rájá of Cach'ha, who built this place, between fifty and sixty years ago. There was a small village before, the name of which is already lost, at least to me. As it was a favourite place of his, he granted to it the exclusive privileges of a *Pátt'aní* town. *Pát* in Hindi signifies the breadth of any thing, of a river, of a gulf. From *Pát*, they have made on the banks of the Indus Pátt'an, in a derivative form ; and there it signifies a Ferry ; and from *Pátt'an* comes *Pátt'aní*, bestowed on towns and villages, where is a famous, and much frequented Pátt'an or Ferry. The towns on the sea shore, which have the exclusive privilege of a Pátt'aní place, have packet boats, which at stated times, regulated by the monsoons, sail to various harbours, either with passengers, or goods.

Crách'í or *Rámbág* is the *Pátt'aní* of the *Vali*, or Nawab of Sind. *Leheri-bandar* was so formerly ; and other places at various periods : hence in the old Portuguese maps is a town, either in, or near the Delta of the Indus, called *Pateniz*. For this information I am indebted to my old friend Mauluvi Sáleh, a native of Calát, and Tasildar of Thátt'há under Golam Mohammad Abásí about 50 years ago ; and is now living at Benares, being above 80 years of age. This denomination is of great antiquity ; for it seems, from a passage of Diodorus the Sicilian, that Alexander built a town in the Delta, which was called *Potana* probably *Basták-Bandar ;* and from the particulars, there is no

* The Tamarix indica according to Dr. Hunter.

doubt, but it was intended to be a *Pátt'ani* town to certain islands, and harbours in these seas.

From *Lác'hpat-Bandar* to *Basták-Bandar*, on the sea shore, seven cos: close to *Basták*, and to the east of it, is a large arm of the Indus, above one mile broad, which leads to a spacious lake of a very irregular shape. Its length N. W., and S. E. is said to be about 12 cos, and its breadth in a S. W., and N. E. direction, about 7 cos. During seven months in the year, there is little water in it; and its limits are then much reduced; but during five months, including the time of the inundation in April, May, and June, and also during part of the rains, it is full, being fed by numerous branches of the Indus, chiefly from the N. E. In the accounts by natives, it is stated, that it is full, or nearly so, during the months of *Vaiś'ákha*, *Jaish't'ha*, *'Ashárha*, *'Srávaṇa*, and *Bhádra*; and that there is little water in it during the months of *Aś'wina*, *Kártika*, *Agraháyana*, *Paus'a*, *Mágha*, *Phálguṇa*, and *Chaitra*. In the year 1809, the first of Vaiś'ákha answered to the 23rd of April; and the last of Bhádra to the 26th of September, at least at Benares: at other places it is earlier. From that circumstance it is called *Ran*, and *Rain*; which in the language of that country implies a tract of ground, which is under water during part of the year, and remains dry all the rest. Abul Fazil, in his account of Gurjarát, mentions a vast extent of ground towards the Puddar, which is yearly inundated, and is also called *Ran*, probably from the Sanskrit *Ar'na*, water. During the dry season, it is even in the narrowest part nearly three cos broad. There are boats ready at *Basták*, with ferry passengers. They go in a N. E. direction, following the bending of the shore to the right: the passengers are landed near a Fakir's hermitage, with a few huts, and then they proceed by land, in a S. E. direction, to a place opposite *Lác'hpat-Bandar*, and in some measure a suburb to it, where the usual provisions and refreshments, which the country affords, are to be met with. This is obviously the lake *Eirinos* of Arrian, called Saronitis, or rather *Saronis*, by the younger Plutarch; and *Basták* is the *Seuhẹ-ri-bandar* of Otter, which should be written *Sehrákí-bandar*, being in the country of the *Sehrákis*. In the same manner Láheri-bandar is *Lehrákí-bandar*, being in the country of the *Lehrákis*. *Basták* is a considerable place for the country: it has a fort, with a few bad guns without carriages. It belongs to the *Vali* of Sind, whose country ends

there; and on the other side of the river, begins that of *Cach'ha*. From *Basták* to *Ghain'deh*, *Ghaï'deh*, or *Ghaireh*, there are eight cos. Three cos from *Basták* is a small reservoir of water. *Ghaï'deh* is near the confluence of the main branch of the Indus with the sea; and about half a mile from it, and to the east, is the village. The Indus is called here, in the dialect of Cach'ha, *Mehrán*, and *Mehrāwan*, which last is to be pronounced as a dissyllable.

From *Ghaï'deh* to *Pokhyárí*, an insignificant village, there are ten cos. It is on the western side of the Indus, which you cross. A little to the north of Pokhyárí, the Mehrán sends a branch into the lake *Ejrinos*, and through it Alexander descended with his fleet. It is called the *Pokhyári* river, even under *Basták*.

From *Pokhyárí* to Sháh-bandar, they reckon 27 cos, and in all from *Ghaï'deh* 31; when you are obliged to cross the Indus three times. *Pokhyárí* consists only of a few wretched huts: hence to *Rádí* or *Rérí*, another place equally wretched, 8 or 9 cos. As the western bank of the Indus is overgrown with the *Lunî* shrub, and uninhabited, they cross the Indus, and go to *Sindhú*, a small village inhabited by Mussulmans, and 7 or 8 cos from *Rádí*, and on the eastern bank of the *Mehrán*. Hence 8 or 9 cos, there is another village called *Balochara*, inhahited by Mussulmans likewise; and going along the banks of the river for 8 cos, they re-cross it, and land at a place called the Nawáb's Chokey, and *Ghát;* and go three cos by land, to Sháh-bandar.

The course of the route from *Ghaireh* to this place, is said to be N. and S., or nearly so. There are boats at *Pokhyárí*, and those, who can afford to pay for them, go in one tide to the above Chokey, or Guard-house.

From *Basták*, you may go to Sháh-bandar by the way of *'Abád*, leaving *Ghaï'deh* several miles to the left. *'Abád* is two, or three cos to the west of the main branch of the Indus, and two long days march from Sháh-bandar. It is called *Hebath* in the life of Mahmud Ghaznevi, who took it. Abulfeda calls it *Ebiath*, and also *Mow*, which in Hindi, signifies an inferior staple town, for various articles of trade: but this difference is often disregarded.

Another considerable town in the Delta, called *Cacréláh* or *Cacarháleh*, is of late frequented by pilgrims, owing to a rich Hindu, who, sometime ago, built a temple there, with a large house for himself, and

a *Dharma-sálá*, or Alms-house, for the reception of pilgrims, who are entertained there, and dismissed with alms. This circumstance has brought this place to our knowledge. It is situated between two arms of a branch of the Indus, called *Mana-muc'há*, and which springs from the western arm of the Indus, three cos below Sháh-bandar. I suspect this river to be the *Hijamany* of Major Rennel; for *Tjya-maná* signifies the *sañgama*, or confluence of the river *Mana* with the sea. To the north of *Cacar-háleh*, it divides into two arms, which, a few cos below, fall into the sea. Opposite to the town, the bed of the *Mana-muc'há* is very broad, and there are extensive fisheries. The water is brackish; but the inhabitants dig wells, the water of which is good; but remains so only a few days. From *Cacar-háleh* to Sháh-bandar, they reckon 31 cos by water; 28 up the *Mana-muc'há*, and three up the western branch of the Indus. There you land at a place called *Rájghát*, opposite to Sháh-bandar, where there is a large *Ma't*, or convent of *Nánac-panthis*. Mauluvi Saleh informs me, that *Cacar-háleh* is the name of one of the four Sircars of the province of Tha't't'há, including the Delta, as far eastward, as *Basták*. In the Ayin-Acberi it is called *Chucur-háleh*.

Sháh-bandar may be considered now as the capital of the country on account of its size, trade, and because many of the first officers of government reside there.

Ġolám Mohammad 'Abbási took it from a Hindu prince of the *Sohdá*, or *Sogdá* tribe, and made great many improvements. It is situated at the head of the Delta, where, at the point of division, is the place of *Bábá*, or *Báwá-Pethá*, or our lord *Péthá*. It seems, that it was formerly an island, and during the rains, it is even now nearly so: but the bed of the channel, which separated it from the Delta, is almost filled up; yet it remains a morass to this day, over which the inhabitants have made one, or two bridges, as they call them; but which are a sort of causeway made of hurdles, fascines and clay, with a few small openings to drain off the water. This place is called by Hindus *Nagar-Pat'há*, and Nagar-Tath'há; but not to be confounded with *Sindhu-'Tha'tt'há*, which is our Tátá. It is so called, from a deity, or holy man, called *Pathá*, with the title of *Bábá*, or rather *Báwá*, the lord *Pát'há*, and by Mussulmans not improperly rendered *Pir-Pat'há*; and whom they have converted into a Saint of their

own. *Báwá* is the same with *Bau*, a title well known among the Mahrát'tás, and which, according to a learned pandit of that country, is derived from the obsolete root *Bu*, lord, master; and which in Persian signifies father only implicitly, in the same manner as we use the words *Sire* and *grand Sire*. From *Bu* comes *Bau*, and *Báwá* a lord, and *Báwí*, or *Bái* a lady, in the Máhrát't'á language. *Báwá*, and *Bau* are used in that sense in the Burman language, in which they call the emperor of China *Odey-Boá*, or the lord and king of the east. The holy *Tat'há*, or *Pát'há* is also called *Aghár-Báwá*, or *Bábá*, and at Multan *Bábá-Pit'hu*. The three first denominations in Hindi, imply power, greatness and skill. This is the town of *Tátáh*, asserted by Abul Fazil to be called also *Debiel*, and *Alore*, in some copies Alwar. In the Persian Tables, cited by Major Rennel, in his first Memoir, it is equally asserted that *Táthá*, is the same with *Daibul*. This *Táthá* is of course different from the Tatah of our maps, the true name of which is 'Tha't'thá, and Otter says, that the head of the Delta is two days by water, below *Nagar-Thátthá*, or *Thatthi*, which he spells *Tschatchi*. The denomination of *Debiel*, *Dibul* seems to be unknown in that country, except perhaps to sea-faring people, who sometimes bestow on places, names unknown to those who live further inland.*

Capt. Hamilton is entirely mistaken, when he says that *Divellí*, in the language of that country, signifies the seven mouths. It is by no means the case with that language, nor, I believe, with any other in India. They use, on the banks of the Indus, the same numerals as in Hindi, except the two first, *Bere* or *Vere* one, and *Bá*, *vá*, *bé*, or *vé* two. The first is the Hindi *Eic*, with the addition of the letter R. Thus in Icelandic, instead of *eim*, *one*, they say *eirn*. *Ba*, *bé*, or *vé*, is now obsolete, both in Sanskrit, and Hindi: but it is the root of *Vincshati*, or *Vinc'hati* in Sanskrit, and of *Bis* in Hindi, which signify twenty. It is the root in Latin of *bis* twice, and of *viginti*, also of *ambo* both.

Debil, *Divul*, or *Diul* seems to signify the island *(Div)* of *Yala*, or Hálleh, the meaning of which is unknown to me; though often found in composition in the names of places in that country, and all over the peninsula, as *Hálleh-cundi*, on the Indus; *Cacar-háleh* in the Delta;

* I never saw Otter's works: but an extract was sent from Europe to the late Father Tieffenthaler, who gave it to me.

Yella-mundi, Yellogoody, Yále, Yáleswara, &c. Diodorus calls it *Yálá,* and says, that it was situated in an island. Yet, I think, this etymology inadmissible, as I do not think it idiomatical to say *Dív-Yálá;* it should be *Yála-díva,* and I cannot find a single instance in which *Div,* or *Dib* is prefixed in composition. I suppose it derived from *Dev-Yálá,* the divine Yálá, or Hálleh, and in this country, and in Gurjerat they say *Dé,* or *Dí* for *Déva;* and thus *Dí-Yala,* or *Diul.*

In this manner the town *Deva-Raufálá,* or *Rupálá* in the desert, to the east of Bacar on the Indus, is generally called now *Di-Rawel.* Our *Yalá* is certainly a most sacred place, being dedicated to the divine *Pat'há,* who is constantly attended by 900,000 Ríshis, or holy men. *Pathálá* is a regular derivative form, from *Pat'há,* as Bengálá from Banga: and from it our ancient travellers and writers made *Pátálá,* and even *Pathalia. Hálla-wárá* is another name for this place, generally contracted into *Alowr,* or *Alore,* and mentioned by Abul Fazil: but it is now unknown to the inhabitants of that country. *Yail-díva,* or *Yala-díva,* in the Malabar dialect, signifies the seven islands, but it would not be idiomatical to say with Capt. Hamilton *Div-yail,* which he renders by the seven mouths.

Our ancient navigators, and travellers, and even eastern writers, do not agree about its situation; some placing it at Láheri-bandar others at Cránchi: and it appears to me, that at whatever emporium merchants were allowed to land, and dispose of their goods, on this they indifferently bestowed the name of Debil. Merchants were not always allowed to come up to the Metropolis, or go too far inland, for political reasons.

Mauluvi Sáleh mentioned to me a similar instance, when he was at Thatthá. El Eldrissi says, that Dabil was three days from the sea, and as many from Mansaurah (the lower) now Thatthá, which was three days from Firuza, or Nirun now Nehrun, or Hydrabad, on the west bank of the Indus. It was also two days from Manhabere, Manhawer, or Minnagara, on the side of which is a place of worship called Pír-Patthá, and one day's march south of Tátthah; it is called Bráhminábád by Abul Fazil; and Shehr-Baráhemá by Persian writers,* or the town of Bráhmans: it is the Ráhemi of Danville, and it is still a purgunnah called Berhampur, for Bráhmanpura, at least I so sup-

* See D'Herbelot, voc. Cambait.

pose. It is called Bachmanu, for Brachmanu, by Chrysococas: thus in India they say Bahman, for Bráhman. His Mansaurah is the Táṭáh of our maps, and Danville's Táṭáh is Sháh-bandar; and here he is right.

The town of Pethá, or Táthá is situated in the Delta, on the western branch of the Indus, and since the improvements made by Ǵolám Mohammad, it is now only between two or three miles from the extreme point of the Delta; but the old town was two cos and half, or five miles from it. There is no arm of the Indus to the north of the other Thátthá, as I am assured by Mauluvi Sáleh, who resided there seven or eight years in a public capacity. D'Herbelot says, that Deibul (or Táthá) was besieged in vain by Solimán, the second king of Persia; but I find no such a king in the history of that country.

In the latter end of the reign of Akbar, it was besieged by his general Khán-khánán with a numerous army; the siege lasted six months; but after a most obstinate resistance it was taken. This town could not have been the present Thátthá, which could not have held out so long: but it was Táthá, or Debiel, which was so strong, on account of its insular situation. It was denominated Sháh-bandar, or the royal emporium, in honor of Akbar. In some old Portuguese maps, it is simply called Bandel for Bandar, and in Father Monserrat's map of India it is placed, exactly half way, between the mouth of the western branch of the Indus and Thátthá. The denomination of Sháh-bandar seems to be unknown to Hindu pilgrims, and is used only by Mussulmans; who never use that of Nagar-Táthá, except when applied to Thátthá.

The pilgrims now prepare themselves to go through a dreadful country, belonging to a mighty goddess, always ready to befriend mankind, but at the same time highly irascible, and who, for the most trifling offence, will inflict on the unfortunate culprit, either an incurable leprosy, or turn him into stone, or drive him into madness, by various and uncouth sounds, and strange noises. Pilgrims are however so much upon their guard, that no such accident ever happens, and these noises are not always to be heard; and then they are very faint. They must not bathe all the way, nor wash their faces, or hands, rinse their mouths, or even wash certain parts, as usual on particular occasions. This tremendous deity resides at *Hiñgláj*, about seven or

eight miles to the eastward of cape *Mu'dán*, or Moran. They now hire guides, who are well acquainted with the religious places on the road, the rites to be performed at each place, and the legends relating to them, which are both numerous, and equally ridiculous. There are two routes from Sháh-bandar to Hiñgláj; one called the *nine* days route, because they are exactly that number of days on the road; the other, for a similar reason, is denominated the *thirteen* days route. Pilgrims, however, are not always so exact, and they will sometimes take two or three days more; and this depends upon the quantity of provisions, they are either able, or willing to carry on their backs.

As far as Sonémchyáni, the two routes are the same: and from that place to Hiñglaj they reckon three roads; one by sea, seldom frequented; the other along the sea shore; and the third is more inland; and this last takes up seven days on foot; but they generally hire camels, and perform it in five days. When they go along the sea shore, they cross the outer mouth of the *Háb*, at Sonémchyáni, and as no provisions can be procured on the road, they must take some at the last place, both for going, and coming back; and carry the whole on their backs. This is of course, the most difficult, and besides you must travel on foot: pilgrims who travel this way are very numerous indeed. Those, who want either zeal, or bodily strength, go the thirteen days route, which is very expensive, as it is performed on camels; and I lament, that I never was able to meet with any body, who had travelled that way. Several intelligent and learned pilgrims have repeatedly told me, that I had no occasion to regret it; as their route affords very little geographical information: for it does not pass through any town, or place of note. They had seen several, who had gone that way, and who informed them, that they cross the *Háb* at the first fordable place, where there are only a few wretched huts. They then ascend the heights, and go to Hiñgláj, leaving *C'hárá-Beileh*, a great way to the right. Some descend through what is called the Elephant's neck, and send their camels to Hiñgláj, performing the rest of the journey on foot. The only thing remarkable on the road, are the tombs of the old Jogi, or Durveish, and of his disciple, of whom I shall hereafter take some notice.

All along that route, but more particularly between Sháh-bandar, and cape Monz, there are great many places of worship, dedicated to

various deities. There are however no buildings, and there are nothing else, but trees of the Bábul, or Acacia, Tamarind, and Palása kind, stones, springs, small pools, hillocks, &c.; and of which I shall seldom take any notice. Our pilgrims being ready, and having taken provisions, to last them as far as Rámbág, which they reach in three days they cross the Indus about two cos below Sháh-bandar; and about a gun-shot from the river, is a small pool dedicated to Siñha-Bhaváníderí: a little further is a small river, which runs into the Indus: three cos further is another small one, which runs also into it. It is called *Cauryá*, the lazy, or slow moving river; like the *Coorya-Gañgá*, or Jellinghi in Bengal. This, with the former stream, are supposed to be branches of an arm of the Indus, which springs from the main stream, near Peer-Pathá, about a day's march to the south or S. S. W. of Thatthá. There are a few wretched huts, on both sides of the *Cauryá* river: and about two miles from it, or six cos from Sháh-bandar, the road goes over a low, but extensive hill called *Támra-thileh*, or the mountain of copper; because it contains quarries of a yellowish stone, like brass, and in some places, rather inclining to a reddish hue like copper. *Támra* implies both brass and copper, as in French they say, red and yellow copper. This mountain is mentioned by Abul Fazil in his account of Sircar Tatah. Besides the quarries, this mountain abounds with small pebbles or *calculi*, about the size of the larger sort of millet, of a whitish crystalline matter, debased with earths of various kinds, and which in their rough state, look like corn coarsely ground, or grit, in Hindi *Dardura*. They are of course supposed to be the remains of Devi's cookery, who, for twelve years, dressed food there every day for her consort Mahá-Deva; but which she constantly threw away at night, seeing that he did not return. These are polished, perforated, and filed on a string by Mussulmans at Sháh-bandar, and then sold to pilgrims, at the rate of one thousand to a rupee, and from their faint yellowish colour, they are called Támra. These small gems, or pebbles, are mentioned by Pliny, who bestows upon them the name of *Zoronisios*. According to him, they are found in the bed of the Indus, and were highly valued by the *Magi*, or religious people in India.* They are found in small quantities in the bed of the river; but these are neglected, as the adjacent quarries afford an

*Pliny, B. 37th C. 10th.

inexhaustible treasure of them; and they are still highly valued by pilgrims. *Zoronisios*, or *Dzoronisios* is from the Sanskrit *Jaran'asya*, pronounced in Bengal, and written by several Sanskrit scholars, *Dzoron'osyo*. Jaran'a, and its derivative, implying sort of food, ready dressed; also its remains. In the Tamuli dialect, such pebbles are called *Paruccai-callu*, or stones looking like *Paruccai*, or grains of boiled rice and millet. The pilgrims come afterwards, to a small stream of fresh water, beyond which, at the distance of about a mile, is a small village called *Gáreh*, which they reckon fifteen cos from the *ghát*, and seventeen from Sháh-bandar, or 32 British miles. Hence to *Crimáji*, a small village consisting only of five or six wretched huts, four cos: here there are two roads; that to the right leads to *Rám-bág*, and that to the left to *Láheri-bandar*, about four cos, in all 25 cos, or 47.5 British miles from Tat'há; but some considerable allowance is to be made for the windings of the road, which are here considerable, and will reduce the whole distance to 40 miles. The road from Tat'há to Láheri-bandar lies on the right of the western branch of the Indus, the other side being impracticable. Of course it does not follow, that Láheri-bandar is on the right side of that branch. However, I believe it to be so, as it is declared in the Ayin-Acberi to be a purgunnah belonging to Sircar Tatah of our maps, and of course it is out of the Delta. I never saw any body, that had been at Laheri-bandar, except Mauluvi Sáleh; who visited it about 50 years ago; but, as he says, never saw it, as he arrived after dark, and left it before day light. He remembers very well crossing a river close to it; but cannot recollect on which side of it the town is situated. From Láheri-bandar to *Rám-bág*, there are 13 cos, or 25 miles. By water, it is first five sea leagues down the river; thence, along the sea shore, ten nautical miles, in all 28 British miles. By land little allowance is to be made, as the country is flat, and level, and the 25 miles may be reduced to 23. About 14 or 15 miles from *Crimáji*, they come to a desert place, and about a musket-shot to the right, is a small river called *Matsar*, dry at that season of the year; but there was a well of good water in its bed. It falls into the bay of *Crách*, and here the guides inform the pilgrims, that the sea is very near. Between this place, and *Crimáji*, there are two *C'haris*, *C'haricás*, or *Creeks*, into which the tide flows. Hence ten, or eleven miles to *Rám-bág*: they first cross a *C'hari*, which comes

from the Indus, and into which the tide flows; for such is the meaning of *C'harí*: about half-way, a few huts, and a well; and within two or three miles from *Rám-bág* is another *C'hari*; but, whether there is an inland communication by water, through these creeks, with the western branch of the Indus, is unknown to the pilgrims, whom I have consulted. In this country, they have no itinerary measures, and the word *cos* is unknown: they compute their rate of travelling by *pahars*, or *prahars*, as they call them, and their parts, or ghurries. When the days and nights are equal, the *prahara* is of three hours. It is of course difficult to adjust the particulars of their routes; but as this road has been travelled by pilgrims for ages, and perhaps as early as the times of Alexander; they have, through long experience, reduced, and computed the distances, between the principal places on the road, into *cos*, and which I find to be pretty accurate. Some unavoidable disagreements with regard to the particulars are, of course, immaterial, when the grand outlines are ascertained. In the Table of the distances through India in Persian, and ascribed in a MSS. lately in my possession, to Muhammad Cámbucsh Sháhzádeh or prince royal, born A. H. 1077, A. D. 166$\frac{6}{7}$, the distances are given both in Royal, and Rismi, or small *cos*; and it is there declared, that two Royal *cos* are equal to three and half Rismi; thus the Royal *cos* is equal to two British miles and five furlongs: the common cos of India, to one mile and seven furlongs; and the Rismi to one mile and a half. There the distances are given, in general, in Royal cos, or at least intended as such, from actual measurement, it is supposed, but in some cases only in common, or Rismi *cos* from report. Thus from Láheri-bandar to Bandasyl, there are 994 Royal *cos*, 1740 Rismi: but the particulars exhibit 30 cos from Silhet to Bonasyl, and these are certainly Rismi. This is also the case with Láheri-bandar, which is reckoned 30 cos from Tathá, are Rismi, equal to 55 British miles. The distance from Tat'há to Silhet is 934 Royal *cos*, to which add twice 30, and it gives 994 cos. The Mussulmans, and particularly the officers of government in that country, formerly computed the distance from Tathá to Rám-bág to be 30 Royal *cos*, or 78 British miles; and this computation is still used by many in that country. There at *Rám-bág* is a *C'harí*, or Creek, which joins the *Matsar*, and thence goes into the bay of Cránchí. The *C'harí* is on the right of the road, and the fort is about a *cos* from it

inland, and *Cránchí* is upon the Creek, about half a cos from the bay; though the greatest part of the houses are now round the fort. Half a cos to the S. W. of the Fort, toward the bay, there is a small lake, or large pond, in which there are crocodiles, of which wonderful stories are related. Ráma-chandra remained there twelve years with Lakshma'na, Hanumána, and Sitá, and made a garden, called after him Rámbág. In the bay there are several small rocky islets, three of which are particularly noticed by pilgrims: the largest is called *Ráma-Zaroca*, or the observatory, or watching place of Ráma-Chandra, who erected a *Zarocá* upon it. *Jaroc'há*, or rather *Dzeroc'há*, in Sanskrit Jálaca, is a latticed window, for the sake of observing, what is going on abroad; also a peeping hole. By the *Zaroc'hás* of Ráma, Lacshma'na, &c., the pilgrims understand certain mounds, or raised platforms, either natural or artificial, for the above purpose, and in this sense it is synonymous with *Seirungah* in Persian. According to Father Monserrat, the largest of these islets was called *Camelo* by the Portuguese; and the three principal ones *Monaras*, or the turrets, from the Arabic *Minára*, and opposite to them is a small branch of the Indus. He does not say positively, that he had been there himself; but I believe that this was the case. The several passages relating to this place stand thus, *Canthi Naustathmus* sorgi douro das "*Monaras*, statio pro turribus dicitur juxta *Monaras*..... *Canthi Naustathmus* stationi respondet scopulorum, qui pro Indi hostio eminent, et vulgo dicitur *Monaras*, h. *(hoc est)* turres vel pyramides, ab Arabibus accepto vocabulo.

"Extra ostium Indi insulæ Chrysé, et Argyré—necubi apparent. Eminet tamen, *nostrâ memoriâ*, deserta quædam insula et perexigua, quam vocitant *Cameli*, ex adverso hostii amnis: sed ea saxum ingens, exors auri argentique." Here the words *nostrâ memoriâ* are, in my opinion, to be rendered, *I recollect*, *&c.*, and imply, that he had been there. The original MS. is in my possession.

The bay was called Rio de Pilotes, or the Pilot river by the Portuguese, who had always some of them stationed there, in order to conduct their ships over the *bars* of the Indus, and their ships remained there at an anchor, waiting for a proper opportunity, and it is called for that reason *Naustathmus* by Ptolemy. This place is styled the harbour of *Hermes* by Haython the Armenian, who mistakes

Ráma for Hermes an ancient sage. It is designated also by the appellation of the fort of *Ram*, in the treaties of peace concluded between Nádir Sháh, and the emperor of India; and by that of Rámgar, *Coyár*, or Couhbár in the Ayin-Acberi. Our pilgrims, having visited in a boat the *Zerocá* of Rám, cross over to the other side of the Bay, and after a march of eight or nine cos, about 15 or 17 miles, they arrive on the banks of the river *Háb*, which they cross, dress their food, and sleep there. There is about one foot of water in it, during the dry season: its bed is broad, and it is a pretty large river during the rains. Its bed is full of large rounded stones called *Gallets* by Buffon. Its current is rapid, and makes a considerable noise among the stones. It was called *Ab-Indos* by the Portuguese, and in some maps *Obandos*, or the Indian *Háb*; and by Father Monserrat *Ab Indorum rivus* in Latin. The country between Rám-bág, and this river is full of stones, which were formerly men, and who will resume their original shapes, at the end of the world. On the fourth day, at night the pilgrims sleep on the banks of the *Háb*, and, early on the fifth, resume their march. From this river to *Sónemeyáni*, they reckon 20 cos, or 38 British miles. The first part of the route is intricate, and having no fixed points, they never agree about the particulars, till they come to a place called *Rámpranala*, or *Rámprabáh*, which is acknowledged to be 12 cos, or 23 miles from Sónéméyáni: these deducted, leave 8 *cos*, or 15 miles for the distance from the Indian *Háb* to *Rámprabáh*. To the West of the *Háb* is a range of hills, running parallel to it, and very close to the river opposite to the ford, there is an opening in the range, which, though narrow, affords an easy passage; the range to the left runs toward the sea, and the distance is supposed to be five or six *cos*, and ends at Cape *Mun'd*, a name unknown to our travellers. The ford and pass are guarded by a form of *S'iva* called *Jhangár*, or *Thangár-Bhairava*, or the tremendous one, maker of *jungles* and *twangs*, from the Sanskrit *Jhah* or *Jhanjha*, and *Thah*, in the spoken dialects *Jhang*, and *Thang*; both are expressive of the *twang* of a bow-string. These are heard only, when he is not irritated, otherwise these sounds are such, that people will either die through fear, or be driven to madness: and here begins the country of *Jhang*, or noises. This tremendous deity has a seat, or station in the bed of the river, and also in the

pass, which they call his *Chokey*, or watch-house. His Sanskrit name in the Puráñ'as is *Darddures'wara*, or our lord in the shape of a Bull-Frog. The pass is about two miles long, and at some distance from it to the right, is a small hill called *Angákeryá*, or of the loaves. There was the oven of *Locá-mátá*, or the mother of mankind, in which she used to bake bread, for her numerous offspring: but once through her indiscretion, all her loaves were turned into stones, which now lie scattered all over the country. They are circular, and about five or six inches in diameter, and *Angákeryá* in Hindi, is a round loaf of that size, now very seldom used, at least in this part of the country. They are made of wheat: but in the Scanda-purá'ña it appears, that all these stones, or perhaps part of them only, were originally the fruit of the Bílva-tree, and indeed they look very much like it, both in size, and colour. To the left of the road, at the distance of about a mile and a half, is the *well* of our mother, but seldom visited by pilgrims. Near this hillock, resides a form of *S'iva* under the name of *Angákeryá-Bhairava*, who defends the pass, and pours showers of these stones upon the assailants, whilst *Jhangár* or *Jhancára* frightens them with dreadful noises. They both defended it against Ráma-chandra, and his numerous army, for twelve years, when they were forced to give way.

A little further, at the bottom of the declivity, begins the dry bed of a river, divided into four very distinct portions, by three depressions, where this dry bed is hardly visible. The first part is very little below the surface of the country, and full of round stones, upon which pilgrims are directed to lay themselves down, and to perform *Lo'tan*, that is to say, to tumble, or roll themselves smartly three times in honor of the mother of mankind. Hence it is called the river *Lo'tan*. This dry bed was excavated by *Ráma-chandra*, and his army, after they had gone through the pass, in order to obtain water; but in vain, owing to the displeasure of *Hingulá-Devi*. The next portion of it after the *Lo'tan* was made by Hanumán; hence it is called his canal *nala*, *váha* or *báh*. The third is the work of Lacshmañ'a, and is equally denominated after him. There is his seat, or watching place, called his *Zerocá*, or *Seirungáh*; and by digging into the bed, good water is obtained: it is about a mile from the sea. Then comes the canal of *Ráma*, which is the largest and deepest; hence it is called

his *pra-nala* or *prabáh*, *Ráma-nala*, or *Ráma-prabáh*. There is his *Zerocá*, or Seirungáh also, and fine water is obtained by digging into its bed. This place is about half a mile from the sea, and then the bed trends toward the N. E. to the right of the road. Rám-prabáh is about fifteen miles from the *Háb*, and about twenty-three from *Sónemeyáni*. The three last portions of this dry bed, are about 400 feet broad, and about 30 deep: the banks, particularly on the Eastern side, are almost perpendicular, and higher in general on that side, toward the hills; and it seems to have been formerly a branch of the *Háb*, or river *Arbis*. According to the Mahá-Bhárat, these were excavated by the famous Vasu-rájá.

The country is a perfect desert, with low trees, and a few thickets of underwood, here and there. About three cos, or six miles from *Rám-prabáh*, and *Ráma's Seirungáh*, is *Maica-Coiñh*, or *Coiñh-Ambá* in Hindi, the well of our mother. This was produced by her, out of mere compassion for Ráma-chandra, and his army, after their fruitless attempts to obtain water, by making these deep canals. There the pilgrims rest themselves during the night of the fifth day. Early in the morning they resume their march, and after travelling six cos, or eleven miles, they arrive between ten and eleven o'clock, on the banks of a feeble stream. There the level of the country sinks suddenly, forming, as it were, a steep and bold shore, which begins at the sea on the left, and trends toward the N. E.; forming a long curve to the east of the bay of the *Háb*. This bank or shore, is about 40 feet high, and there has been cut through it a *ghát* or pass; and the earth, that was thrown up on both sides, was made into the shape of two regular little conical mounds, one on each side. A few hundred yards, from this descent, is a small stream in some places not six inches deep, which runs toward the left into the sea, which is little more than a mile distant as far as they could judge. From the top of the *ghát* there is a full view of the sea, and of the place where the stream falls into it, and there was the harbour of *Morontobara*, which no longer exists, but the canal, which led from it into the bay remains still, though no longer navigable.

After a march of three cos, or six miles nearly, they arrive at *Sónemeyáni*, between one and two o'clock; and having taken some refreshments, and a little rest, they embark: and if the wind be favourable, they

go directly to the opposite side of the outer mouth of the *Háb*; and the distance is reckoned about three cos, or six miles. Should the wind prove unfavourable, they take a circuit through the bay, availing themselves of the remaining part of the tide of flood, and with the tide of ebb they come down to the usual landing place. This compass is about seven cos or thirteen miles.

Sónemeyání in an island, or peninsula, or rather both, if I may be allowed the expression, is situated on the Northern side of it, toward the bay to the Eastward, and at some distance from the outer mouth of the *Háb*. It is a small wretched place, chiefly inhabited by Musalmans. The trees, and groves, which Nearchus saw there, no longer exist: tolerably good water is obtained from wells, which however must be digged afresh frequently. Its ancient, and extensive fisheries are now much neglected: and from them it is asserted, that its name *Sónemeyání*, or the golden fisheries, is derived from their immense returns.

In that case, its name should be spelt *Són-mahyání*; for *mahí* in that country, and in Persian also, is fish; *sona* is the vulgar pronunciation of the Sanskrit *Swarna* gold. It is called also *Sónyánpurí*, the golden town,* and *Sanawain* by El Edrissi.† The latter is for *Sónyání*, or *Sónyain*, which are derivative forms in the vulgar dialects. El Edrissi says, that in Kirmán, there are also *Sanauain* and *Mascán*, which last is near *Kircaian* towards the source of the *Háb*. In the Portuguese map of that country, in the travels of Z. H. Linschot, the bay at the mouth of the *Il-Mend* or *Háb* with the peninsula, and an arm of the river toward the west, are remarkably well delineated, and the peninsula is called with propriety an island. Its name *Zarnaque* seems to be from *Swarnaca*, the golden island.

The real name of *Són-mahyání* is *Pher*, or *Phor-mohánd*, or the mouth of the river *Phór* or *Phér*, another name for the *Háb*, from a town of that name on its banks. It is called *Fermoun* by Ebn-Haucal, and *Berment* in some old Portuguese maps, as in that of the Persian empire, in Ortelius's Atlas. On the opposite side of the *Háb*, in the above map, is a place called *Beccar*. Its true name is *Macara*, and a little further west, is *Mette*, for *Mátá*, or *Hiñgláj-devi*.

* See Asiat. Researches, Vol. V. p. 43.

† See El Edrissi, pp. 51 and 59.

To the north of *Berment*, in the above map, is *Adbil* or *Azbil*, a place of some celebrity, because the sect of the *Ali-Iláhiyáhs* is supposed to have made its appearance, and prevailed there for a long time. It is called *Abil* by El Edrissi; and is the same, I believe, with the *Azend* of Ebn Haucal; and the true reading should be *Azbil*. The pilgrims having taken provisions (a little meal only) cross the mouth of the bay, and if the weather be favourable, they land at a place called *Macara*, W. N. W. of *Són-mahyání*, and about six miles from it. This is not to be understood of the breadth of the outer mouth of the *Háb*, which, I suppose to be about a mile and half broad. The boats, in which they embark, are generally near the eastern part of the town, and from this place, the six miles are to be reckoned. They land, where the *surf*, from the sea, ends. It used formerly to spread desolation all over the bay; but a holy man, finding the rib of an immense whale, lying dead on the shore, fixed it into the ground, and forbade the *surf* to go beyond it in future. It lies horizontally nearly, and one extremity is partly buried in the ground, which is very stiff; but the other is wholly buried into it. From this circumstance, this spot is called the place of the *Mach'hicá-Har*, or fish bone; *Macara-Hár*, or bone of the Macara, Magar, or Whale, or simply *Macar*. It is called *Beccar* in the Portuguese maps, *Pagálá* by Nearchus, and *Pegadæ* by Philostratus. Whether these names were originally the same, or not, is immaterial, as they point to the same place. Philostratus in speaking of *Pegáda* says, "Here is the country of copper (or *Támra)* and also that of gold (*Swarna*, or *Soná*)."

Our pilgrims, as soon as landed, worship the *Macar's* bone; and set off immediately, marching the whole night and part of the next day; when about three o'clock, they arrive on the banks of the western branch of the *Háb*, or river *Phór* or *Phér*. The country is level, their course west nearly, and the distance is 15 cos, or 28-5 British miles. There on the banks of the *Háb*, they take a frugal repast, and spend the night of the seventh.

Ten, or eleven cos from the whale bone, are the wells of *'Acráh*. *Cupa* a well, *Cupán* wells in Sanskrit, and if the name of a place *Cupana:* in the spoken dialects *Cúwañh* a well, *Cúiñh* a small well; and as the wells of *'Acráh* are small ones, they are called *'Acra-ca-Cúiñh*. Their waters were formerly bitter, but a holy man, by putting

into them branches of the *Mádár*, or *A'cráh* tree, made them fresh, and palatable: and they are a little more than a mile from the sea. This tree is called in Sanskrit *Acrá* the name of the Sun, and it is the cotton tree.

About a mile to the east of the *Háb*, is a place called *Lakeryá-co'ta* or rather *Lakeryá-cú'ta*, the heap of wood; because every pilgrim leaves there a stick, for the benefit of Ráma-chandra, and his numerous army; when the former, in the character of Calki-avatára, will go, and encounter Bali, the Hindi Anti-christ; and this will enable him to dress food for his troops, in this dreary place. All the treasures, which are buried in deep vaults in Nepál, and other districts in the mountains of Himálaya, and to the north of them, will be opened, and with these Ráma-chandra will pay his troops, procure grain, &c. Without these wise precautions, Anti-christ might prevail. Those who hoard up these treasures, it is true, have no such idea, but they are secretly influenced by an invisible agent. This place is also called *Ghacariyá*, from the noises heard there, and there is Ghacariya-Bhairava: this word is generally pronounced Ghaukeríyá. This river is a branch of the *Háb*, which springs out of it, above the bay, and is remarkably well delineated in the map annexed to Linschot's travels, as I observed before. There it is called *Caurecá*, and in other maps *Caoricá*, which is perhaps a corruption from Gaukeriyá or Gaucriyá, as it is often pronounced. Its course however is very oblique, with regard to the sea shore; and it falls into the sea, about two or three miles from the place, where the pilgrims cross it. During the dry season, there is no water in it; but it may be obtained in plenty by digging into the bed; which is choked with sands at its mouth; but it is supposed to be open during the rains. It is called *Phór* or *Phér*, from a town of that name, on the banks of the main stream.

Gaukeriyá or *Gaucriya* is another name for it, from the place of that name in its vicinity, or because the *Ghaucriyá*, or noises begin to be heard there: for this reason it is denominated *Colcalá*, because the *Colcalá* or noises of *Chan'dicá-devi* begin to be heard there about midnight; being compared to the distant twang of a bow string, or of the string of a musical instrument, similar to that which seemed to come from the statue of Memnon, and is probably a trick of the guides, who are really the priests of Hiñgláj. *Colcalá* is from the Sanskrit

the sea shore: and which is compared to a *Cunjara*, or huge elephant, buried up to his belly into the ground. The head, on which is situated the fort, seems to look toward the sea, and projects considerably to the south. The depression between the head, and the body is very obvious, and is called the elephant's or Cunjara's neck. Of the head alone of the elephant they take notice, and the low point I mentioned before, being opposite to it, is denominated Cunjaráh. According to the Scanda-puráṇa, the mountain of *Cunjará* was the daughter of Himálaya, and the wife of mount *Chrauncha*, who in his human shape having been killed by S'iva, all his wives, and *Cunjará* among them, made dreadful lamentations, and cursed S'iva.

This fort is the place of abode of *Chan'dicá-'deví*, a form of Hiñguládeví, or Hiñgláj. She is a most irascible deity, which, for the most trifling offence, will turn men, animals, ships, &c. into stones, plants, and trees. This place is the metropolis of *Strirájya*, or the kingdom of the woman, and it is called also *Chan'di-gráma* and by Pliny, *Condigrama*. Whatever man enters its walls, never returns; of course no account can be given of the inside. The rocky summit of the elephant's head, appears like the ruins of an old fortified town. Such appearances are not uncommon along that coast, according to former navigators, and Alex. Child, in the year 1616, being 26 leagues W. N. W. from Guadel, took notice of seven rocky eminences inland, looking like so many castles in ruins, and called by the Portuguese the seven cities. Towards the east, near the neck, is a small ravine, and higher up, is something like a gateway, and the ravine is called the path leading to it. From the depression of the neck, and the low grounds below, issue a feeble rill, which runs westward into the *Haur* river. Its bed is generally dry, but good water is easily obtained by digging into it. On its banks, and about two miles south of the gateway, the pilgrims spend the night with fear and trembling, at least they tell you so, and early on the ninth day, they resume their march, and this is truly a most fatiguing day. From their resting place, on the preceding day, there are about 13 cos, or 25 miles to the banks of the *Haur*, and considering the trending of the sea-shore, the course I take to be W. S. W.

There is a consecrated tract of land, beginning about two miles east of the *Haur*, and extending about twelve cos toward east. It is very

near the shore, but its breadth N. and S. is in some places only four or five cos. In going through this holy ground, they must suppress all sorts of evacuations, they must not spit, blow their noses, and throw the matter upon the ground, &c.; otherwise they would be punished with an incurable leprosy. They cross it in an oblique direction, and reckon the distance to be travelled over, to be about six cos, or twelve miles. When they approach it, the guides admonish them, and on replying, that they are ready, on a signal given, they all set off, like so many dogs after their game (such is the expression, they use themselves) heedless of one another. When fatigued, they occasionally lie down, and by their reckoning, they traverse this holy ground in three hours. Some pilgrims prefer to go round this tremendous spot; but this is reckoned unfair. This holy ground is called *Camalá-páth*, or the seat of *Camalá-devi:* another name for it, is *Colá*, or *Golá-páth*. It consists of a stiff, whitish clay, which softens during the rains, and the whole becomes an impracticable quagmire; and indeed this is asserted of all the low grounds between the *Háb* and the river *Haur*. The whole country, between these two rivers, is called simply *Camalá*, *Golá* and *Colá;* and by El Edrissi *Colwán*, from *Colá-van;* and this denomination is also made to extend, beyond the mountains to the north, called in Sanskrit *Darddura*, which is mentioned in the Puránas, as the name of a country, and of some mountains in that part of India. *Chandicá-devi*, who is really the *Circé* of the Hindus, is, from her living there, called *Darddurí;* and she might also be styled *Círí*, or *Circá*, as she resides in the country of *Círa*.

About two miles to the east of the river *Ghaur*, the pilgrims perceive the sea, and some rocks, among which there is one larger than the rest. These are supposed to have been ships, and boats formerly; which with all their crews were turned into stones by *Chan'dicá*. The same story is related, concerning a rock close to the island of Ashtola in that country, by Capt. Blair, who says that the natives assured him, that the island was enchanted. Some merchants had attempted once to settle at the mouth of the river *Haur*, and had built a little town, which was frequented by ships loaded with various articles of trade. The goddess had told them repeatedly that she disapproved of their settling so near to her; but they insisted, and were justly punished for their obstinacy and presumption.

This town is called *Cambele* by El Edrissi, and *Camhal* by Háji Califah, from *Camalá*. The river retained that name, even to the time of the Portuguese, who call it *Camelo* in their maps. The town was 1500 paces from the sea, and existed before the time of Alexander. These rocks are called *Hinláh* in some late surveys for Hinláj; but had it not been for this curious legend about them, the pilgrims would not probably have taken the least notice of them.

They arrive afterwards on the banks of the river *Haur*, much fatigued, and after having eaten and drank in the evening, they sleep the whole night, and the next day they perform their ablutions, for the first time since they left Nagar-Tathá, or Tethá. The sea is not to be seen from that place, and they could give me no information about its distance, which I suppose to be about four or five miles. The bed of the river is about 500 feet broad, the stream, in the dry weather about 100; and in the deepest part about three, or three feet and a half. Its water is limpid, and very good; it runs with great velocity, and for this reason the tide does not come up to this place. About a mile from this river, is another small one, called the *Hiñgulá-Gañgá*, which comes from the north, and falls into the *Ghaur* river; and its source is within the ravines of *Hiñgláj*. The pilgrims then travel N. W. for about two miles through a broken ground, with small hillocks, and a few low trees, and shrubs, to the foot of the hills of *Hinláj*. This is properly the table-land of the country; for the real range of hills is several cos further to the west. This table-land consists of white chalk; for which reason, they are called *Dhavalá-giri*, or *Dhaulá-giri*, This table-land is not above 70 or 80 feet high; but is intersected by many ravines, and among these ravines, are all the numerous places of worship at Hiñgláj. There is a stream at the bottom of almost every one, which uniting, forms a small river called *Cán'ere*, from the number of flower-bushes of that name. There are many of them, in the gardens, in the Gangetic Provinces; its flower is of a red colour, and its Sanscrit name is *Carn'acára*. The *Cán'ere* runs toward the east, into the *Hiñgulá*, and through its bed, is the entrance into the holy recesses of *Hiñgláj*. From the *Ghaur*, they reckon six cos, or twelve miles, to the westernmost parts of these recesses; but, on account of the numerous windings, I suppose the horizontal distance, to be about six or seven miles only. There are no statues, nor temples; but shape-

less stones and dark cavities in the ravines, are dignified with these names. *Loca-mátá* the mother of mankind, is the chief deity, and before her temple, they strip naked, and rolling themselves upon the rough pavement, like madmen, call out "*Ai-mátá! Ai-mátá!* cleanse us from our impurities." *Ai-mátá* signifies the woman our mother literally, but here it implies our lady, and mother. Musulmans, who take her to be Eve, have translated *Ai-mátá* by *Bibí-Nání* our blessed lady, and grandmother. She is styled in the Puráṇas *S'rí-Mátá*, our blessed mother; *Devi-Mátá*, the goddess our mother, and Loca-mátá. There is a part of the rock supposed to be a statue of Gan'es'a, but his head, *Mud'án*, is several cos further. Bábá-Nána has also there a place dedicated to him. The pilgrims remain there one or two days, and then return the same way they came.

The valley, between the western ridge, and the fort of *Chandicá*, I suppose to be about eight miles broad: it inclines to the east of north, and forms a slight curve in that direction. The river *Ghaur* runs through it, and is fed, in the lower part, by many rills from the ridge to the west of it.

Through this ridge is a famous pass, leading to the westward, called *Rájáhán*, or *Rájáhán't*, that is to say the place of the discomfiture, and total overthrow, of the Rájás: for Ráma, both in the character of Parasú, and of Chandra, overthrew there, the confederate kings of the *Cufs*: hence it is called *Cophanta* by Ptolemy, from Cuf-hán't, the place of the discomfiture of the *Cufs*. I never saw but one pilgrim, who had visited this place; though it was known by name to others. There were no inhabitants: he saw one or two pools of good water, and its distance from Hiṅgláj, he supposed to be two or three days' journey. It was then twenty years since he had been there, but as far as he could recollect, it was at a considerable distance from the river *Haur*. A high road from Tha't'thá, through *Kij* on the *Háb*, and *Cárá-Beileh*, leads through this pass.

Cárá, or *C'hárá-Beileh* is a pretty little town for the country, situated in a beautiful spot, well cultivated, and on the banks of a little river, supposed to be the *Haur*, or *Ghaur*.

This place is known by name to several pilgrims; but I never saw but one who had been there. He was a Sikh priest, and a well informed man. According to him, it is four days from Hiṅgláj,

and greatly to the east of north from it. There were neat brick buildings, with beautiful orchards and gardens, and the inhabitants seemed to be in good circumstances. This town, I suppose to be the *Er-mayil* of El Edrissi; the *Armaiel* of Ebn Haucal.

Beileh signifies a town, a village in the dialect of that country, and is, I believe, the true reading; and the account given of it by El Edrissi agrees with that of the SIKH priest. From the particulars given by Arrian, there can be no doubt, but it is *Rambákia*, or *Rámbág* situated in a delightful spot, and the largest town in the country; and this induced Alexander to colonise it, and it was called *Alexandria* afterwards. Q. Curtius says, that Alexander reached the country of the *Arabii* in nine days, (I suppose from Pathala) and, that on the fifth, he crossed the river *Arabus*. He then entered the country of the *Arbii*. This river *Arabus*, or *Arbis*, I take to be the Indian *Háb*. On the ninth day, I suppose, he arrived on the banks of the real *Arbis*, on the confines of the *Arbii*, and of the *Oritæ*, not of Gedrosia as he says; for Gedrosia includes both the *Arbii* and *Oritæ*. This passage is obscure, owing to the carelessness of our author. This river, says Arrian, is not very deep: this is true of the Indian *Háb*, but not of the other, at that season of the year; and I have been assured, that its banks in general are very high, much broken, and the *ghâts*, or passes very difficult: for which reason, travellers avoid as much as possible the valley, through which it flows. Thence Alexander went to *Rámbág*, now *Cárá-Beileh*, or *Haur-maiel*: El Edrissi says, that it is two days from *Kir*, or *Kij* on the *Arbis*; but Ebn Haucal says four; and I believe he is right. It appears from Arrian, that *Rámbág* was at considerable distance from the pass, through the mountains of Gedrosia; and I suppose it to be between one and two days from it. Thereabout Ráma-chandra waited for some time, till he could bring the confederate kings of the Cofs, or Caphs to an action. They had entrenched themselves strongly in the pass; but being allured down, they were completely defeated; hence the field of battle has ever since been called Rájhán or Rajhán't, and Cophán't, or the place of the slaughter of the confederate Rájás of the Cophs. Parasú-Ráma did the same before, and Ráma at the end of the world will encounter Bali, and his allies, and give them there a complete overthrow. The place, where their immense armies were stationed,

for a considerable time, was called as usual *Rámbág*. Tradition has recorded *Rájhán't*, but says nothing about this *Rámbág*. Alexander, in consequence of the nature of the ground, took exactly the same measure with his predecessors, and followed the same steps, and was equally successful. This place is the *Cophanta* of Ptolemy; though misplaced by him, as well as *Ora*. There might have been several towns denominated *Cophánta*; for the Caphs' country extended, from the entrance into the Persian gulf, unto the Indus. They are called *Capis* in Sanskrit, and their country *Capi'sáyana*. Another name for it, is *Kí'da*, or *Kíra*, probably the KIR of Scripture, and in Hebrew *Caphtor* signifies the mountains of *Caph*, *Caphs*, *Cophs*, or *Cepheneus*.

Some pilgrims, from report only, say, that to the north of Hiñgláj, there is a considerable town called *Ghaurí*, or Hauri, upon a small river in a delightful spot, and supposed to contain about 6000 inhabitants, which is a great deal for the country. They did not agree about the distance; some supposing it to be four days; others five or six, and even seven, like the *Horœa* of Arrian. Whether it be the same with *Haur-Beileh* is uncertain. One of them, if two different cities, is the *Ora* of Ptolemy, and the Horœa of the author of the Periplus. From it the country is called to this day *Haur-Cánán*, or *Haur Cáan*; and its ancient inhabitants *Ori*, and *Oritæ*. The southern parts are called *Colá* by pilgrims, and *Colwán* for *Colá-van*, both by El Edrissi and Ebn Haucal. The country to the east of the *Háb* is called *Rahun* by El Edrissi, and *Rahouk* by Ebn Haucal; and Mauluvi Sáleh recollects the latter or *Réhook*; either as the name of a town, or of a tribe, to the west of Tha't'thá. *Rávaca* in Sanskrit implies a country of strange noises from *Rava*, or *Raba* noise; and from it, is formed in Sanskrit *Áraba*, or *Árba*, either with B or V, and *Áraba*, which being used as the names of a country, or of a river, become *Arabá*, *Arbá*, and *Árbí*, *Arabá*, or *Arabí*, and *Arabaca*, or *Aravaca*. Whether these denominations were meant originally to signify a country full of strange noises, is certainly doubtful. None, however, of the preceding etymologies are mine: but the Paurániçs suppose, that, in all countries styled *Stríráj́yam*, or country solely inhabited by women, strange noises are heard, and some occasionally really so dreadful, as to drive those who hear them into madness, or even so as to cause instant death. Be this as it may, there are several such coun-

tries in India; one in the peninsula, another near the mouth of the Indus; and several in the mountains to the north. This *Strí-rájyam*, near the mouth of the Indus, is peculiarly noticed in the only section remaining of the *Mahábhárata* of Jaimini. Hanumán, who is still alive, resides in *Strí-rájyam* in the peninsula; and these dreadful sounds, are supposed to proceed from him. The women, who reside in this southern *Strí-rájyam*, are greatly inferior to Hiñgulá-deví, and her forms: these were originally the wives of Rávana, who kept them in a place of security, among mountains, in the peninsula. Rávana having been killed by Ráma-chandra, the conqueror allowed his wives to remain unmolested in that place. He even left some of his own amongst them, and Hanumán was appointed their guardian. They are all addicted to sorcery, very lewd; and they all endeavour to decoy men into their precincts. The country to the west of the Indus, as far west as Persia, and to the north, as far as Candahar, is called *Kí'da*, or Kíra in the Puráṇás; from which, in a regular derivative form comes *Kírmán*, and *Kíra-sthán*, its present modern names. It is divided into *Kí'da* proper, or Gedrosia, and Macráu, for *Macarán*, or the whale country: Stephanus of Byzantium is the only ancient author, who notices *Macarán*, or *Macarêné*. **Kí'dá*, or *Kír* is softened as usual into *Kíz*, or *Kíj*, as Munz for Mun'da; Termiz for Termed, &c., and Kedrosia or Gedrosia is from Kid-roh, which in the language of that country, signifies the mountains of Kíd'a. *Macrán*, in general, is supposed to include *Kíj*; hence the latter is called *Kíj-Macrán*. The Indus, in its lower parts, is called *Mehrán* by Musulmans, and *Mêhrávn* by Hindus, who constantly spell it *Mehrávan*.

This is, I am told, in the dialect of Cach'ha; and it seems to be also the name of the country from *Sewán* to the sea: and to the west as far as Cape *Mun'd:* if not further. The country of *Mihrá* is mentioned by Ebn Haucal; and the same is called *Míhrán* by Abulfeda: and these two authors call the Indus *Mihrán:* but the true name, both of the country, and of the river is *Mehrá* and in a derivative form *Mehrán*. Its metropolis is called *Tihrán* by Abulfeda, obviously for *Mihrán*, or *Mehrán*. It was situated, according to him, between *Al-Dobil* on the sea, and *Mansurá*, or Bacar; and was upon the river *Mihrán*. This town of *Mehrá* is called *Bahráj*, for *Mahráj*,

* Steph. of Byzant. voc. Alexandria.

by Haji-Califah, and it is the *Beherje* of Ebn Haucal, who places it on the western side of the *Mihrán*, equally with other towns, between *Daibul* on the sea coast, and *Mansurá*. The word *Beherje* is written by him, in another place, *Mehreje*, which is the true reading.* It appears to me, that this town is the ancient *Pathalè*, now *Nagar-Tathá*, or *Sháh-bandar*, whose king is called *Mœris* by the historians of Alexander. When we read in the Ayin-Acberi, that, in former times there was a king of *Tathá*, called *Sehris*, I believe, we should read *Mehris*: for in another place, he seems to call Tathá, Serree or Serris, which is inadmissible; but one of its names was *Mehrá*, *Mehri*, or *Mehrej*.† Abulfazil says, that Sháh-beg Arghon invaded Tatah twice; but on the first invasion Tatah is called *Seeree*.

Mehrej was the name of the town, and of its king, as usual in India; though they had a proper name of their own. The inhabitants, considered as a tribe, or nation are mentioned by Stephanus of Byzantium, under the name of *Mórieis*. They lived, says he, in houses of wood. This is peculiar to the inhabitants of the low grounds, near the Indus, on account of the‡ inundations.

Oriental writers have in this country the sea of Oman, or of Persia, and the sea of *Herkhand*; though according to El Edrissi, both seas were called in the language of India *Harkhand*. This sea is called by the Parsis, according to Anquetil Duperron, *Fer-Khend*, from the adjacent country. Gedrosia is called by eastern writers, *Cánán*, sometimes shortened into *Cáian*, and it is divided into three parts, *Kij-Cánán*, *Pher*, or *Phor-Cánán*, and *Haur-Cánán*. *Pher-cánán*, or in Hindi *Pher-c'han'da* is I suppose, the true name of that sea; and from *Pher-cánán* comes Ptolemy's *Paragonos*, or *Paragonon Sinus*, gulf, or sea; though certainly somewhat misplaced by him. The gulf of *Terabdon* at the mouth of the *Háb*, mentioned by the author of the Periplus, is perhaps a corruption from *Pher-ábdhi*, the sea of *Pher*, or *Phor* in Sanskrit. The sea, about the mouths of the Indus, is called the sea of *Sinda*, by Stephanus of Byzantium; from an inland town of that name. P'her or P'hor formerly Pura, is now more generally called Kij-Mecrán: though Kij, and Macrán be two distinct towns;

* Ebn Haucal, pp. 139 and 145.

† Ayin Acberi, Vol. 2d, pp. 146 and 149.

‡ Ditto ditto, p. 137.

but as they are not far from each other, they are generally named together, a very common practice in India. Some suppose P'hor, to be called Kij-Macrán to distinguish it from another town in Macrán proper: this being situated in the country of Kíd or Kíj. Kij called Kír by El Edrissi, is the ancient Arbis.

Ptolemy with the Hindus reckons seven mouths to the Indus: it has many more; but this is a sacred number; and it is the same with regard to the Ganges. None of the modern names have any striking affinity, with those recorded by Ptolemy; of course, in a comparative essay, I have but little to say on this subject. We are hardly acquainted with the mouths of the Indus: in every new sketch, new names are introduced; old ones disappear, and transpositions take place. I shall of course content myself with a few general remarks. The meeting of the *Sindhu* with the Ocean is celebrated in the Bhágavat, under the name of *Sindhú-Ságara-sangama*, or simply Ságara, as we say, with regard to the place of the meeting *sangama* of the Ganges with the sea. The outermost mouths are generally considered as more sacred; though sometimes that privilege is in a great measure annexed to one only. This induces me to suppose, that the westernmost branch of the Indus, called *Sagapa* by Ptolemy, is a corruption for *Ságara*. The second is called by him very properly *Sinthus*; being the main western branch of the river *Sindhú*, and is the branch of Láhéri-bandar. The golden mouth, or the third, was probably thus called on account of the immense trade carried on through it. This I suspect to be the middle mouth of the Arrian, and in the bay of *Rishál*, called also Rishád, in the French sketch I mentioned before. The fourth called *Chariphi* by Ptolemy is perhaps the eastern, and main branch of the Delta, from *Gaï'di*, or *Gairi*. *Gaï'di-bhi* is literally *Gaï'di also*, an expression generally used in enumerating various articles, places, &c. It is the largest, and seldom frequented on account of the rapidity of the tides, and the violence of the bore.

The fifth called *Saparaga*, probably for *Saparaganh*, from *Sapara-gráma* in Sanskrit, or the town of *Sapara* at its mouth, which seems to be *Basráh*, a very ancient town, which probably existed before the time of Alexander. This seems to be the mouth called *Pokhar* by Major Rennell; because it communicates with the Indus, through an arm called *Pokhyárí*. It is probably the *Subara* of El Edrissi erro-

neously called *Sourba* by Ebn Haucal. El Edrissi says, that from *Dobil*, on the first limits of India, to the island, or rather peninsula of *Mon'd* or cape *Monz*, there are six miles; but the distance is obviously wrong. From *Mon'd* to *Coli* six miles. This little town, which he calls in another place *Cas-Cahar*, is in the island of *Domai*, or rather on the continent opposite to it. *Coli* signifies a creek, as well as *Charizan*, the *Rizana* of Ptolemy. From *Coli*, says El Edrissi, to *Subara* near the sea, there are five days' journey; hence to *Sandan*, or *Sindan*, according to Ebn Haucal, there are five also. *Subára* falls in at *Sapara*, or *Basták*; *Sindan*, or *Sinda* is the present Tha'ṭ'ṭ'há. This *Sinda*, or *Sindia*, says Ebn Haucal, was called also *Mansurá*. This is the *Sinda* of Stephanus of Byzantium; the *Sindomana* of the historians of Alexander. *Sindhú-mána* signifies the *mansion*, on the river *Sindhú*, and its present name *Sind-Tha'ṭ'ṭ'há* signifies the inclosed place on the Sind. It is true, that El Edrissi, misled by the similitude of names, has confounded these two places with *Supara*, and *Sandan* near Bombay. But Ebn Haucal mentions these two places, and his Geographical information does not go beyond the gulf of *Cach'ha*.

The sixth is called *Sabalassa*, a very uncommon name: but the Bhágavat accounts for it, in a curious legend relating to the *Sindhú-Ságara-sangama*. *Dacsha* the eldest son of *Swayambhuva* or Adam, but not born of a woman, was directed to marry; and to proceed to the pro-creation of mankind. He obeyed, married, and had two sons *Haryás'va*, and *Sabalás'va*. They both went to the mouths of the Indus: *Haryás'va* placed himself near the western branch, and *Sabalás'va*, probably near the branch of that name; and in a short time they produced each a thousand male children: but they all went to *Naraye'n-sár*, or the pool of Naraye'na, near the easternmost mouth of the Indus; renounced the world, and obtained eternal bliss.

The seventh mouth called *Lóni-bári*, is that of As'ápúrí, and probably so called from *Bári*, an inhabitation, in the middle of a forest of low shrubs, called *Lúní* in that country, and *Jhau* on the banks of the Ganges; and which really overspreads the Delta, and the adjacent country. This branch is not to be mistaken for the *Nala-Sancara*, which is to the west of the Indus, and which it rejoins above *Sewán*, being a branch of it, and its old bed. The *As'ápúrí* branch springs out from the Indus, below *Sewán*, and passes within seven cos to the

east of *Tha'ťťhá*, and was seen by Capt. Whittington in the year 1613. Near the mouth of the seventh branch is, I believe, *Deva-Náráyana-Sár* or the pool of Narayana, also the place of the filthy *Cali-linges'wara-Mahádeva*, or the lord with the ten millions of Phalli.

From the longitude, and latitude assigned to *Cáraichi*, and the three next mouths of the Indus by Father Monserrat, their respective distances are as follow :—

Canthi-naustathmus stationi, respondet Scopulorum, qui pro Indi ostio eminent. This he calls also in Portuguese *Sorgidouro das monaras*, and from it to the mouth of *Sagapa* called *Barra d'Ormuz*, he reckons four nautical miles and a half: thence to that called *Sinthus*, or *Barra do Guzarate* nine miles: to the *Aureum ostium*, or *Barra do Gemal* a little more than eighteen miles. Gemál is probably the name of the Musulman Saint, entombed on the eastern shore of the bay of Rishál.

In the year 1786, a French Frigate, called, I believe, the Venus, anchored in the bay of Rishál, and remained there a fortnight. Some of the officers went in the longboat to Sháh-bandar, and made a sketch of the bay, and of that branch, that led to Sháh-bandar, as far as that town. One of them soon after came round to Calcutta, where he was introduced to Mr. R. Johnson, who died lately in England, just as he was returning to India, and with whom I lived. At his request the French officer gave me a copy of their survey. They certainly did not do much, but there is every reason to suppose, that their survey is sufficiently accurate. That gentleman declared to me, that the bay was called *Dishád*, and *Rishád* by the natives, and that they had made particular enquiries about it. According to the sketch, the general direction of the bay is N. E. by N.: but its greatest length from the tomb to the east, to the bottom of a recess, or inner bay, and due north from it, is between seven or eight G. miles. Its breadth N. W. and S. E. between four, or five miles N. E. by N.: from the tomb, about five, or six miles, is the entrance of the branch leading to Sháh-bandar. At the bottom of the recess, is an arm coming from the N. W.; and another leading to the sea, in a S. W. direction, and this is called *Juhú*. This is the bay into which Alexander, and his fleet came through a branch of communication, between the western arm of the Indus, and this bay; the breadth of which according to Arrian

was 200 stadia; but the numbers in Arrian are erroneous, and we should read 100 only. It was open to the sea toward the south, and during the stormy weather, which prevailed at that time, his fleet suffered much: but having procured guides, Alexander carried it into smaller channels, where it was safe. According to the above sketch, Sháh-bandar is 37 geographical miles, horizontal distance, from the tomb to the east of Rishál bay, and 36 degrees east of north from it. The latitude of the tomb, according to Major Rennell, is 24° 14′; and this will place *Sháh-bandar* in Latitude 24° 42′, and in Longitude 67° 11′.

On the branch, that leads from Sháh-bandar into the bay, there is a town called *Sháh-gar*, 16 miles nearly from Sháh-bandar; and to the S. by W. of it. It is remarkable, that the situation of *Sháh-gar*, answers to that of *Sháh-bandar* in Major Rennell's map; and *Sháh-bandar* in the sketch, stands in the room of *Aurangábád*, whilst the latter is carried, about one day's march, above the point of the Delta.

This sketch extends no further to the westward, than *Jahú*, a small river noticed also by Major Rennell, and to the west of it, near the sea, is a small place called *Nowi-bandar*. The rivers to the east of Rishál, are the *Jumná*, the *Kaar*, and the *Goreh* (for *Gaireh*) or *Baniány*. The Jumná is called *Hyjamany* by Major Rennell, and I believe the latter to be its true name; for it is idiomatical in the dialect of that country, in Sanskrit, and in Hindi; but it should be spelt *Ijyámání*, from *Ijyámána*. *Ijya* is synonymous with *Sangama*, and *Ijyámána* signifies the confluence of the river *Mána* with the sea.

Ebn Haucal mentions two considerable places here, *Resasil* and *Canteli*: the former was about a mile and half from the sea, and the true reading, I suspect to be, *Raz-Asil*, or the Cape of *Asil*, called *Asawel* by El Edrisi, probably from *A'sáwálí*, the name of the seventh branch, from the *sthán* of the goddess *A'sá*, and the Cape is to the S. E. of its mouth. Hence, says Ebn Haucal, there are two days' march to *Canteli*, a considerable town. *Canteli* is probably a mistake for *Cunti*, the name of the country, and its metropolis is called *Cunti-Bhoja* in the Puráṇas. Arrian says, that beyond the lake *Eirinos*, is a point of land, where begins the gulf *Báraká*, or *Dwáracá*. It seems to be that called *Churcar* in modern maps, and *Massada*, perhaps for *As'ada*, in the old ones. Arrian gives a good account of the dangers

attending the navigation of this gulf; in which he mentions seven islands, and one of them, called Báraká by Ptolemy, is the same, in which is situated *Dwáracá*. *Báracá*, and Dwáracá are synonymous, as I have shewn in a former essay.

Arrian is certainly mistaken, when he says, that one only of the seven mouths of the Indus was navigable. I believe it never was the case, and certainly Alexander went through four of them. I believe that Alexander, from the island of *Pattala*, went first, down the western branch of the Indus; and three or four cos below the town, got into the branch that leads into the bay of Rishál, from which he returned into the western branch to an island called *Cilluta*, where there was good water, and a safe anchorage. Thence he proceeded down the river and saw another island at sea. He did not go to it, but returned to *Cilluta*. Q. Curtius has transposed the whole: he makes Alexander go first to *Cilluta*, thence to the bay of *Rishád*, and afterwards to the second island, which is not likely. His three days to the sea, are to be reckoned from *Pattala*, and his 400 stadia from the first island to the second. His account of Alexander's navigation, through the Delta, I conceive to be this: he procured guides at *Pattala*, who were ignorant, what the sea was; but it was found out, that they called it the bitter water, or *Khárá-páni*: and it is so called to this day by the natives of the Delta of the Indus, and also of the Ganges. This *Khárá-páni* was three days journey from *Pattala*. On the third day, in the morning, they began to feel the sea air, which they recognised immediately. About nine o'clock, in the morning, the tide came rushing with violence into the bay, and his fleet suffered much. Having procured fresh guides, he was advised to take shelter in some narrow creeks, and channels, which he did, and thence proceeded to the island of *Cilluta*, in the middle of the western branch, where his fleet was safe. He then proceeded down the channel for 200 stadia, and saw, at a distance, an island at sea. The distance from *Cilluta*, probably Láheri-bandar, to the second island was 400 stadia, or 27 miles; which fall in at *Crotchey* bay, where there are some high rocky islands seen at a great distance, and I believe it would be difficult to find another island to answer our purpose in the vicinity, either of the western, or any other branch.

The country is very low and flat, and I doubt not, but that the

highest of them may be seen, at the distance of twelve miles inland. Father Monserrat says, that a small island, with other rocks, rises very high just before the mouth of the Indus, meaning a branch of it. It is called *Camelo*, and is a large rock; and there the river runs directly east and west. Those rocks, says he, from their altitude, are called *Towers*, and *Monaras* (for Minars) by the Arabs; in whose language *Monara* (Minára) signifies a tower, or pyramid. This station, for the shipping, is called by the Portuguese *Rio do Pilotos*. On one of these rocky islands, Alexander erected altars to Tethys, and the Ocean, according to Diodorus the Sicilian.

It is probable that Alexander was desirous to survey the channel himself, through which his fleet of discovery was to pass: whilst Leonnatus, at the head of a strong detachment, was marching along the right bank of the western branch. These islands, opposite to the mouth of the Indus, are noticed by Pliny: and it is the opinion of Father Monserrat, that these are the same islands, though says he, there be neither gold nor silver to be found there. There are three rocks of a larger size, than the rest; and probably they were considered by the Hindus, as usual with them in similar cases, as representing mount Meru, with its three peaks of gold, silver and iron. Be this as it may, Pliny brings Nearchus and his fleet from *Xylenopolis*, down the westernmost branch of the Indus, opposite to which were several islands. This place is the *Coreestis* of Arrian, and the modern *Cárá-chi*, *Crách*, or *Cáraichi*; for these several denominations are equally used. As there is very little wood in the Delta, and the lower parts of Sind, it was procured from time immemorial from *Sóneymyání*, and the mouth of the *Arbis*, and brought to *Láheri-bandar*; which became the mart, and staple for that useful article: hence some suppose, though erroneously, I believe, that its true name is *Lackeri-bandar*, or *Xylenopolis*. The wood imported consists, in general, of poles in their rough state from the forest, for rafters. These poles are called in Hindi *Gola*, in the west *Colá*, in French *Gaule*. The town of *Colaca* of Ptolemy answers, from its situation, to *Láheri-bandar*; and it is called in the Puráṇas *Collaca*, and also *Sindhú-Colaca* from its being situated on the Indus. *Colaca* is a Sanskrit derivative form: but in the spoken dialects of the countries, from Muttrá to the Indus, they would say *Colati*, and *Colachi*; and from these two last, the historians

of Alexander made *Cilluta*, and *Cillustis*. Thus from *Mehva*, the name of a tribe west of the Jumná comes *Mehvati*, a man belonging to that tribe: from *Coel* in the Doab *Colati*, a man, a horse from that place. *Colachi*, or *Colchi* are seldom used, except as the name of a place, and are considered as a derivative from *Cola*, whatever be its meaning. One hundred stadia below *Xylenopolis*, Nearchus anchored at the entrance of a large channel called *Stura*. The letter *S* should be left out, as in *Scilluta*, and *Stoberus*, &c. *Túrá*, or *Túrí* is not an uncommon name of places in India: and its derivative *Twer*, *Twárí*, and *Tewárí* are oftener used; and there is such a place in Jungleterry.* Within the Delta in Sircar *Chucar-háleh*, according to the Ayin Acberi, there is a small district, and town called *Tewárí;* and I suspect that *Daráwáy*, is either a corruption from *Tawári*, or is derived from *Túrá*. *Turá-váh* in the dialect of that country, and also in Hindi, and Sanskrit, signifies the channel of *Túrá*. The western branch of the Indus, below Láheri-bandar, divides into two channels, the largest of which, is to the left, and is called *Daráwáy:* there Nearchus anchored, and then entered the smaller one to the right.

I believe, that the distance to the two next stations *Caumana*, or *Caumara*, and *Coreestis*, and between them also, is too short, and that there is some mistake in the numbers. Curtius reckons 400 stadia from the first island, or *Cilluta* to the second close to *Coreestis*, and I believe that he is right. Nearchus says, that at *Caumana*, a little more than one mile from the sea, they found for the first time, that the water was brackish, but I am assured, that the water of the various branches, in the lower parts of the Delta, is not drinkable, at the distance of eight or ten miles from the sea; except in the main branch, owing to the rapidity of the current, and perhaps except during the time of the inundation which had been long over, when Nearchus put to sea.

From the mouth of the western branch Alexander returned to *Pattalá*, and thence he proceeded down the eastern, or main branch; then through the channel of *Poc'hyárí*, entered the lake *Erinos* now *Rá'n* or *Ar'na*. From this place, he went with a body of cavalry, along the sea shore, for three days, and probably as far as the river *Mu'd*, *Mu'dí*, or *Mudai*. He returned to *Pattala*, and soon after

* See Major Rennell's Book of Roads, pp. 134 and 185.

came back to the lake, and there ordered a naval yard, and dock, to be constructed on the spot probably, where *Basták-bandar* stands now, and this is, I believe, the town of *Potana* mentioned by Diodorus.

Justin says, that Alexander built another town in the Delta, called *Barké;* this is the emporium of *Barbariké* of Arrian, called *Barbari* by Ptolemy. It was in the middle mouth, and I suppose at the bottom of the bay of Rishál, having a little island in front. *Barrá-bári* signifies the great inclosed place, or the greater Bári. Many villages in that country are called Bári, or Thatthí from having either a mud wall, or some other fence all round. Several places are called Bar-báryá, for Barrá-bári, in the eastern parts of India.

But let us return to Nearchus, whom we left at Coreestis, or Cáraichi; called also *Carcede* by the Portuguese formerly. There he had been obliged to cut through the bar, at the mouth of the river, during the recess of the tide. This is sometimes done in the Sunderbunds in Bengal, and other places in the Ganges, and if Alexander did not meet with the same difficulty, it was owing probably to the tide rising up higher at that time. From this place they reached *Crocala*, after a course of 150 stadia, or nine miles; but 20 Roman, or 18½ British miles, according to Pliny. It was a sandy island, which, I suppose, was at the mouth of the river *Háb;* and of which I took notice before. Father Monserrat, in his MS. map, says, that there was a Bay at its mouth, and writes opposite to it in Spanish, *Enseada dos Ab-indos capar sellada*, the two last words of which, I do not understand. *Crocala* is probably derived from *Colcala*, or *Corcala* in the spoken dialects, or the river of noises. This river *Háb* is the *Hyphasis* of Philostratus, who says, that it runs through a narrow bed, full of stones, and falls into the sea with a dreadful noise. This account is greatly exaggerated, as may be supposed. This *Háb* is also the river Arabus, or Arbis of Q. Curtius, who says, that Alexander crossed it on the fifth day from Pathala; four days after which he crossed the real *Háb:* but the passage from that author is certainly obscure.

Leaving *Crocala* Nearchus proceeded, having a promontory called *Eirus*, to the right, and a low island, almost level with the sea, on the left. It runs parallel with the coast, and so near, as to leave only a narrow channel, winding between both. This island does not appear in the maps, and perhaps it no longer exists. If so there is still a

shoal, seemingly above water. For Dr. Vincent, to whom I am indebted for these particulars, says that Commodore Robinson's squadron rounded Cape *Monze* at a considerable distance, to avoid a shoal, which extended to the southward of that promontory.* This Cape is called *Mund* by El Edrisi, and *Monz* in our maps, from the Sanskrit *Mun'da* a head, and headland. It is called *Wair*, and *Howair* by Arabian writers, *Vaihár*, or *Waihár* in Sanskrit; and with it, they mention also the mountain of Cosair, with another opposite to them, called *Dordur*, and the sea near them was called *Ghazera*. El Edrisi mentions several other mountains so called, at the entrance of the Persian gulf; a third near the island of Comar, and the fourth at the extremity of the sea of Sin.

These were places much dreaded by navigators: the mountains of *Dordura* in this part of India, with a place, or places called *Cach'hara* are mentioned in the Puráṇas. The mountains of *Dordura* were near the sea shore, and *Cach'hura*, or *Cach'hara* implies both a muddy shore, full of quicksands, *punschala*, or quagmires; and such abound in the gulf of *Cach'ha*. These mountains were only sandbanks, as they were often covered by the waves.

(To be continued.)

A short notice of an Ancient Colossal Figure carved in Granite on the Mandár Hill in the District of Bhágalpúr. *By Captain* W. S. Sherwill, *Revenue Surveyor.*

Thirty miles south of Bhágalpur, and partially surrounded by jungle, stands a hill named Mandár or Madsúdan, a mass of naked granite (gneiss) about eight hundred feet in height; this hill from its extraordinary appearance, its fearful precipices and altogether singular position, appears to have attracted at a very early period of history, the notice of the half-wild races then inhabiting the valley of the Ganges.

Viewing the hill from the south it presents on the eastern flank a convex profile of naked granite, measuring about 600 feet over the

* Voyage of Nearchus, Vol. 1st, pp. 196 and 198, edition of 1807.

Circumference of face measuring across the forehead, down the right cheek, under the chin and up the left cheek,	21	6
A line following the profile from the summit of the triangular ornament on the head to the throat,.....	14	4

NOTE.—Taking the head as $\frac{1}{8}$th of the entire body or figure we have 6 ft. 7 in. × 8 ft. = 52 ft. 8 in. as the height of the figure.

This piece of sculpture, although within thirty miles of the Ganges, is seldom visited, and has not been seen by more than half a dozen Europeans.

Influence of the Moon on the Weather. By J. MIDDLETON, *Esq.* F. G. S.

The following reductions, and the observations on which they are based, have been made, during the past year, with a view to ascertain to what extent, if any, the lunar phases influence the weather. It is at first sight easier to admit, than to reject the belief, that the moon may, by the production of atmospheric tides, assist in bringing about changes in the weather; but then it is to be considered that electrical development, and other causes of disturbance, must be sufficiently potent to neutralize or mask, generally speaking, the effects of the moon. This must be especially the case in mountainous countries, where oceanic currents are subject to frequent alteration of temperature and direction. It occurred to me, therefore, that few places can be better situated than this for determining the lunar influence, if any; since disturbances arising from irregularities of surface are almost entirely eliminated; while the wind having a normal direction throughout the year, viz., from west to east, would render particular changes more easy of detection.

Reductions of observations at Greenwich, extending over several years, were, I believe, made sometime ago with a similar view, and gave negative results; but I have no opportunity of reference to them. I observe also by a notice in the Philosophical Journal received by last mail, that Professor Airy has lately read a paper before the Royal Society on the same subject, and leading to the same conclusion. His observations, like the former, no doubt, extended over a long period, and therefore may be looked upon as conclusive so far as the place at which they were made is concerned. The question, however,

is perhaps not one to be settled by observations extending over time merely, although that is undoubtedly necessary to trustworthy results, and this was an additional motive to my taking up the question here. You will remark that my observations extend only over 11 lunations, and cannot therefore be received as conclusive on the point, even with reference to Agra, but it is a commencement which I intend shall be followed up. The month of December, during which observations were not recorded, on account of the matter having escaped me for a few days from press of other occupation, was a particularly steady one; and would not, I believe, have disturbed the general result had that month been also included.

It is a curious fact that the belief in lunar influence on the weather, though continued here by Europeans and maintained by their descendants, is not participated in by either Mahomedans or Hindus; nor, so far as I can learn, is mention made of it in Sanscrit or Arabic books. The inference from this fact is strongly against the existence of any such influence—discernible at least by its effects, in Asia; since one would suppose Astrologers must, if it existed, have detected it. Moreover the setting in of the periodical rains is an event of immense importance to all classes, and if any connexion existed between it and the lunar phases, the circumstance could scarcely, one would think, have remained unnoticed.

I have not sent you the tables in which the observations were noted, since they would occupy more space than they perhaps deserve. The way in which the reductions of them, as contained in the following tables, have been made is this. I have, you will observe, divided the lunar period into four equal parts, named the New Moon, the Second, the Full Moon, and the Fourth Period. The New Moon Period consists of seven days reckoned from three days previous to the day of New Moon to three days after that day, which day being included makes seven days. The Second Period is reckoned in the same manner, with this difference, that the day on which the second quarter of the Moon begins is the middle day, which together with the three days previous to it and the three days after it, constitutes the period. The Full Moon Period has seven days, three days being reckoned on each side of the day of the Full Moon. The Fourth Period has similarly three days counted on each side of the day on which the last quarter of the Moon begins.

TABLE I.

From January to November, 1850.

Summary for each Period.	Rain.			Number of Cloudy Days.	Quantity of Rain in In.	Direction of the Wind.								Change.	Storms.	
	Heavy Rain.	Slight Rain.	Total No. of Rainy Days.			East.	West.	North.	South.	North East.	North West.	South East.	South West.			
	days.	days.	days.	days.		days.	days.	days.	days.	days.	days.	days.	days.		days.	
11 New Moon Periods.	7	5	12	26	5.72	26	41	2	6	..	..	..	..	4 E. to W.; 1 W. to E.; 1 S. to E.	4	1 day Haze. Meteoric appearance.
11 Second ditto.	3	5	8	15	2.64	16	50	..	3	1	..	1	1	1 E. to W.; 2 W. to E.; 1 S. to W.; 1 S. to E.	..	
11 Full Moon ditto.	9	3	12	24	5.74	29	39	1	..	4	..	..	..	2 E. to W.; 1 W. to E.; 4 W. to N.; 1 E. to S.	0	
11 Fourth ditto.	16	10	26	20	6.25	32	37	1	..	4	..	..	2	1 E. to W.; 1 E. to N.; 1 E. to S.; 1 W. to N. W.; 1 W. to S. W.	4	1 day Haze.
Total...	35	23	58	85	20.35	103	167	4	9	9	..	1	3		14	2 days Haze.

TABLE II.

From January to November, 1850.

Summary.	Rain. Heavy Rain.	Rain. Slight Rain.	Rain. Total No. of Rainy Days.	Number of Cloudy Days.	Quantity of Rain in In.	Direction of the Wind. East.	West.	North.	South.	North East.	North West.	South East.	South West.	Variable Winds.	Storms.	
	days.	days.	days.	days.		days.	days.	days.	days.	days.	days.	days.	days.		days.	
New and Full Moon Periods.	16	8	24	50	11.46	55	80	3	6	4	..	..	..	6 E. to W.; 2 W. to E.; 4 W. to N.; 1 S. to E.; 1 E. to S.	10	Meteor and 1 Haze.
Second and Last Do.	19	15	34	35	8.89	48	87	1	3	5	..	1	3	2 E. to W.; 2 W. to E.; 1 S. to W.; 1 S. to E.; 1 E. to N.; 1 E. to S.; 1 W. to N. W.; 1 W. to S. W.	4	1 Haze.

It will be seen that the number of days in which rain fell during the period of observation was 58, of which 24 belonged to the New and Full Moon Periods, and 34 to the two remaining Periods. Again, of the total quantity of rain—20.35 inches—which fell; 11.46, fell during the New and Full Periods, and 8.89 during the remaining two; so that while more rain fell about the time of New and Full Moon, there was a greater number of rainy days during the intervening Periods. The number of cloudy days, again, during the New and Full Moon Periods, was nearly double the number of those during the remaining Periods. The same may be said of the change, or departure from the normal direction of the wind, which at Agra is, as already said, about west. It is to be observed, however, that the change in the direction of the wind, and occurrence of cloud, are closely allied and may indeed be looked upon, with reference to cause, as merely phases of the same phenomena. The difference which appears to be most decidedly in favour of the moon's influence is in the matter of storms. These, however, when they begin, usually follow each other for a few days in quick succession, and the inequality may, therefore, until further evidence be produced, be looked upon as in some measure accidental. This view is encouraged by the fact, that of the four days of storm occurring during the second and last periods, the whole happened during the latter. It is unlikely that this would have been the case were they due to lunar influence; for since the moon passes through corresponding positions relatively to the earth and sun, during the former as during the latter period, some of them would have probably happened in the one as well as in the other. Doubts, such as these, can only be removed by observations extending over long periods, and on this account I propose continuing them or having them continued, as mentioned above. It must be allowed, I think, that so far as these results go, they seem to vindicate in some degree the moon's title to the power with which she has been supposed to be endowed.

The meteor mentioned among the observations was sufficiently remarkable to entitle it to description—it appeared on the morning of the 4th September.

I was awoke on the morning of that day after 4 o'clock by my friend Mr. Williams, Head Master of the College, who announced to me

that something remarkable had occurred towards the north, and directed my attention to the sky, when a truly beautiful object presented itself, viz., a delicate arch of light, extending from about 4° from the horizon on the west, to about 7° on the east, its crown rising up to near the pole star. It looked as if an even and rigid rod, coated with phosphorus, had been made to arch the sky in the manner described. It was seen under very favourable circumstances also, in so far as no trace of cloud was any where visible, and the sky being at the time of that peculiar depth and transparency which is to be witnessed here during a break in the rains. The account which he gave of its first appearance was this. A servant rushed into the house in great fright declaring that the sky had split ("asmán phat giä hai"). He first saw, he said, an immense ball of fire pass from east to west which left behind it the rent which had terrified him so much.

During the time which I was able to observe the arch, about 20 minutes, it increased in curvature near the crown, which, besides, moved slowly through about 2° towards the east. The dawn was now setting in and the arch diminishing in absolute brightness, though still as well defined as at the first, and before it ceased to be distinguishable it had shortened by several degrees, wasting away from the ends upwards.

Agra, 12th May, 1851.

The initial letters of the Nineteenth Súrah of the Qorán.

By Dr. A. Sprenger.

There is a chapter in Ibn Isḥáq which leads us to suppose that the nineteenth Súrah of the Qorân, which contains a poetical history of John Baptist and of Christ, and which Mohammad sent with his fugitive followers to Abyssinia was purposely written to please the Najáshy or king of that country. This is the more likely as many other Súrahs were composed for special occasions. It is therefore not improbable that the five letters which stand at the head of the Súrah, viz. كهيعص, and the meaning of which is an enigma for the commentators of the Qorân, are a Christian Symbol. In Roman Catholic countries the letters

I. N. R. I., meaning *Iesus Nazarenus Rex Judæorum* the words which were written over the cross of our Saviour in three languages, are frequently used, sometimes as an ornament, sometimes as a charm, &c. Should these Arabic letters have the same import? viz. عيسى النصاري ملك اليهوديين. I need hardly to mention that in Arabic the most striking or conspicuous letter or letters of a word are used in abbreviations but seldom the first, thus اخر is expressed by خ in الخ. Travellers in the Levant might inquire what the Christians in Syria, or in the 'Iráq, or in Upper Egypt write instead of our I. N. R. I.

We usually write,

I. N.

R. I.

In this way good Roman Catholics write it every morning on the foreheads of their children with their thumb dipped into holy water, and I dare say the Arabic letters were originally written,

كهي i. e. R. I.

عص i. e. I. N.

and read from below as legends in coins are read.

Literary Intelligence.

Sir Henry Elliot has extended the plan of his "Indian Historians" to ten volumes which are to embody, besides bibliographical and biographical notices, a complete history of the Mohammadan power in India. To this end he intends to give extracts from the authors whose works he notices, selecting from every one that portion which contains the fullest and most faithful account of a given period and illustrating it by the observations of other Historians. By following this original but most laborious plan, he will give us a more trustworthy history of India than we have of any other country. The book will offer all the advantages of a collection like the Monumenta Boica or Muratori, but the materials are fully digested, and illustrated with erudite notes; and the valuable biographical and bibliographical details which form the ground-work, enable the reader to form a correct judgment on the merits and veracity of the authors.

The first volume of this work is before the public, and it contains the general Historians who enter on the history of India down to Jehángyr.

Vol. II. General Historians from Jehángyr to this time.
Vol. III. Arabs, Ghaznawides, Ghorides.
Vol. IV. Khiljis, Toghluks, Tymúr, Sayyids, Afgháns.
Vol. V. General Historians of the Mogul dynasty.
Vol. VI. Special histories of the Mogul dynasty in its rise.
Vol. VII. Ditto, in its splendour.
Vol. VIII. Ditto, in its decline.
Vol. IX. Ditto, in its fall.
Vol. X. Original extracts as specimens of the style of the Historians under review.

Mr. G. Thomas, C. S. is engaged in compiling a second appendix to his coins of the Pathan Kings of Dehli.

At Dehli the Moa*ttá*, which is the earliest collection of traditions, has been published by Mowlavy Mo*h*ammad Mazhar who is now at Ajmeer ;—and Mowlawy *Háfiz* Ahmad 'Alyy is fast advancing with his edition of Bokháry, more than one-half is printed. Abú Dawúd has been lithographed at Lucknow, Nasáy and Tirmidzy at Dehli, and Moslim has been printed in types at Calcutta. We require therefore only an edition of Ibn Májah to complete the six canonical collections of Sunny traditions.

Dr. Sprenger is printing the Kitáb alma'árif of Ibn Qotaybah. He has three copies, every one of which is more than six hundred years old but only one is complete. He is also publishing a new edition of the Gulistán. He follows the text of the MS. of the Asiatic Society of Bengal, which was transcribed for 'Álamgyr, from a copy which the celebrated Caligrapher 'Imád had taken from the autograph, and he adds the vowels and punctuation on a new system.

The first part of the Biography of Mohammad by Dr. Sprenger is completed and will shortly be published. It comes down to the Hijrah.

Dr. E. Roer is proceeding with his translation of the Brihadáranyaka Upanishad, and of its commentary by Sankara.

He also revises the text of the Sáhitya Darpana, which, together with a translation by Dr. Ballantyne, is to appear in the Bibliotheca Indica, and he is engaged in collating two MSS. of the Sañhitá of the black Yajur for publication.

With reference to this last undertaking he would once more call upon all that take an interest in the complete publication of the Vedas to lend him their aid in procuring MSS. of the Sañhitá of the black Yajur veda and its commentary by Sáyaṇáchárya.

A life of Sákya Siñha, the great Bauddha prophet of Maghda, is in the press, and will ere long be published in the Bibliotheca Indica. The work is entitled Lalita-Vistara and was compiled in Sanskrita about the end of the sixth century from ballads in an obsolete *patois* of that language, composed evidently by bards *(Bhát)* at a much earlier period. Several MSS. have been procured for collation, three of them from Nepal, obtained through the liberality of our learned associate* Mr. B. H. Hodgson of Darjeling. The editor, Bábu Rájendralál Mittra has promised an English translation, which will appear along with the text.

At Lahore an Agri-Horticultural Society has been founded by the exertions of the indefatigable Mr. H. Cope.

The Rev. J. Long is engaged in compiling a Typographia Bengalensis which will comprise an account of all Bengali and Sanscrit works, published in the Lower Provinces.

Notice of a Ruin in Singhbhûm.

To Dr. A. Sprenger, Secretary of the Asiatic Society.

Sir,—A conversation having taken place at the last meeting of the Asiatic Society with reference to the ruins of ancient cities found at different times in India and particularly with respect to a communication on this subject which had been received relative to one supposed to exist in *Singbhûm*, I was requested to procure the last report of the Mirzapur Mission, in which the Rev. R. Mather gives an account of extensive ruins found by him on a tour. The Rev. R. Mather made in January, 1850, a tour to Singrauli; passing from Mirzapur to the Table Land of Ghorawal, then to the Kymore range near the valley of the Soane, and so on to the coal mines of Kotah 90 miles from Mirzapur. With regard to this place Mr. Mather says—

"Before leaving home I had heard from Major S. that in this neighbourhood, were certain ancient Hindu structures, the origin of which was totally unknown.

He could not tell me the exact locality, but the Rajah's brother informed us that they were at Márah, a place in the Rewah territory, distant 24 miles. This seemed to us no great distance and so we resolved to go, hoping to make the journey there and back in four days. Our first stage was to Bhurkun a fine large village, 16 miles from Kotah. The next day, we changed our plan and set out with a number of people to see the ancient structures, intending to return the same evening to the tent which came up in the morning. The place we were to visit, is celebrated as being in the dark deep recesses of the forest, hardly penetrable by man or beast. We were warned to go well prepared with fire arms, spears, swords, &c. We were told that they were excavated out of the solid rock, and that there were several separate chambers, and that nobody had ever dared penetrate to the far interior. A Mr. Russell it was said had gone, and had killed a large snake, a sort of dragon, 30 feet long, which some of them said they had seen, and which was called a pahárí titthi. Our people hearing all this were all disposed to stay at home; Dáúd said, he would rather not go, and so we mounted Chhotú on the pony to carry the gun, greatly against his will however, for he had no desire to be either first dish or last to the best tiger of the forest. On arriving at the village of Márah, we got more people, the Rajah's brother having sent written orders that they should go with us. One said we must not venture to enter the cave with fewer than 150 men and an abundance of torches. These reports made us rather nervous, but still, we were resolved to go on. We rode for three miles in the forest, then leaving the road, we made our way through the thicket, cutting down branches as we passed on to allow of the ponies finding room to move, till at length we reached the place on the side of the mountain, covered on all sides by dense and luxuriant vegetation, but having a small clear space to the front. Externally appeared a row of square stone pillars about eight feet high cut out of, and supporting the rock; within appeared other rows. It was such a place as a tiger might well choose for his lair and the idea that perhaps there might be one ensconsed in the far off recesses, made us cautious. We first fired off a pistol within the excavated cavern and nothing issuing we lighted our torches, and ventured in to explore the recesses. We found several small rooms, and the foot marks of the Samur, and also porcupines' quills, but no wild animal. From this, we passed to a second, and then a third building, and explored them all. The whole are probably, 130 feet in length, and in one part, there are two stories, of similar height. The depth of the interior cannot be less than from 40—50 feet. The external pillars are richly ornamented, but being of sandstone and exposed to the weather it is difficult to trace the exact pattern, but in the second building, is a very massive pillar cut on the four sides, apparently representing a four-faced figure, sitting in the attitude in which Budh is depicted.

The writer makes few observations on this, but it may serve perhaps as a clue to further enquiry and may induce some possessed of the antiquarian spirit of a Tod or a Mackenzie to explore the interior of that part of the country. We know little as yet of the districts of India away from commercial emporia and the chief cities. We know from competent data that large cities existed in the Sunderbunds in former days, though they have long since passed under the hand of decay. But every effort ought to be used in the present time to trace out the remnants of "the olden time." Yours truly,

J. Long.

Calcutta, May 6th, 1851.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL

FOR MARCH, 1851.

The Society met on the 5th instant at the usual hour and place.

The Honorable SIR JAMES COLVILE, President, in the Chair.

The proceedings of the last meeting were read and confirmed.

The following gentlemen, proposed and seconded at the last meeting, were balloted for and elected.

Dr. A. Sprenger.

J. H. B. Colvin, Esq.

Bábu Jádabakrishṇa Siñha, was named for ballot at the next meeting,—proposed by Mr. E. Blyth, and seconded by Mr. Heatly.

Read letters—

From E. Lushington, Esq., T. C. Sandes, Esq., J. B. Elliot, Esq., W. J. H. Money, Esq. and W. Greenway, Esq. intimating their resignation as members of the Society.

From the Hon'ble Colonel W. P. Butterworth, Governor of Prince of Wales Island, Singapore and Malacca, and President of the Singapore Committee of Arts and Industry of all Nations, transmitting a printed list of the articles collected and forwarded to England, by the Local Committee of Singapore, for the Great Exhibition of 1851.

From W. Seton Karr, Esq., Under Secretary to the Government of Bengal, forwarding, for the use of the Museum of Economic Geology, a Map of each of the districts of Shahabad and Sarun.

From Captain Burt, 64th Regiment N. I., forwarding specimens of a large sized oyster found in the Kainh river in Penang.

From W. Seton Karr, Esq., Under Secretary to the Government of Bengal, enclosing a report on the Adinah Masjid by Captain Gaitskill.

From W. SETON KARR, *Esq., Under Secretary to the Government of Bengal,*
To the Vice-President and Secretary, Asiatic Society.

Fort William, 19th February, 1851.

SIR,—In continuation of the letter from this office, No. 913, dated the 11th June last, I am directed by the Deputy Governor of Bengal, to transmit herewith, for the information of the Asiatic Society, a copy of a letter from Captain Gaitskill,

Executive Officer to the Superintending Engineer, and to state that his honor has decided that, beyond the measures already adopted, no further outlay is at present necessary for the preservation of the Adinah Masjid of Pandowah, situated near the ruins of Gaur.

The Superintendent of Police has, this day, been requested to direct the Joint Magistrate of Maldah to take charge of the Masjid in question, and to endeavour by all lawful means within his power to prevent its being damaged. If necessary, the Joint Magistrate will have the jungle cleared away periodically, whenever it may be necessary.

I have, &c.

(Sd.) W. Seton Karr,

Under Secretary to the Government of Bengal.

To Col. E. Garstin, *Superintending Engineer, Camp Adina Mosque.*

Pandah, 25th November, 1850.

Sir,—In continuation of my previous communications noted in the margin, I have the honour to forward the accompanying plan, and regret I am unable to give a drawing more in detail, as the unhealthiness of that part of the country at this season prevented my remaining there more than a few hours, but sufficient to convince me that the restoration or even repairs of the Adina Mosque are quite out of the question. The ruin in its present state gives the venerable place an aspect of interest to the antiquarian and visitor, and bespeaks the pristine grandeur of the monument, a small portion of which is standing, and that must inevitably give way to the ravages of time.

There are but few elaborately carved inscriptions still legible, and to be seen is the royal platform and some pillars of polished indurated potstone impregnated with hornblende. The arches and domes are completely covered by a forest of trees and creepers, growing through the masonry, in fact it appears held together by the interwoven branches, which if removed would certainly endanger the structure; and many other of its architectural remains lie scattered around in huge fragments. The outer walls are partially standing. It is a quadrangular building consisting of cloisters surrounding an open Court, 518 feet long by 318 wide.

Five hundred Rupees, which the Government has so liberally given for the clearance of the jungle, has been successfully laid out, and now the whole of the ruin is accessible; and I do not see how the wishes of the Asiatic Society can be further or more effectually carried out than by the protective measures already enforced by the Government for the preservation of the remains of this ancient Mohamedan Mosque, in prohibiting the carrying away of any sculptured pieces of stone or masonry as they separate from the building, and by having the jungle periodically cleared away by the Joint Magistrate of Maldah, under whose special charge, I would take the liberty to suggest its being placed, as it is within his jurisdiction.

I have, &c.

(Sd.) J. G. Gaitskill, Capt.

Offg. Executive Officer.

Fourth Division.

True Copy.

(Sd.) J. W. Beadle,

Offg. Secretary.

Mr. Blyth, Curator in the Zoological Department, read a report on the Mammalia and more remarkable species of Birds inhabiting Ceylon.

The Council submitted a report on the publication of the Bibliotheca Indica.

Ordered—That the report be brought forward for consideration at the next monthly meeting.

Two specimens of carved stone lattices from Bundie, specimens of rock crystals, of sandstone with impressions of ferns, of iron ores, a hone, and a Mahratta MS. purporting to be a History of Bundie, were presented by Rev. J. Long, in the name of Captain E. C. Burton, Harrowtee.

Ordered—That the Secretary be directed to communicate with the Secretary of the Bombay Vernacular Translation Society, as to the value of the MS. presented by Captain Burton.

Read the subjoined extract from a letter from T. B. Mactier, Assistant Magistrate, West Burdwan.

"It may not be uninteresting to some of the members of the Society to mention that while conversing with the natives concerning their idea of the origin of such stones (the Aerolites), one mentioned, that many years ago he had seen in the middle of the jungle some 100 cosses to the S. W. of this, the remains of what he called an enchanted City, the inhabitants of which had all been turned into stone. He described one street as a bazar in which tradesmen such as chutars, moiras, &c. were to be seen in the act of carrying on their various trades, other persons had heard of the existence of such a place, but none could give me exact information f its whereabouts. As my informants could have had no motive in telling me a complete falsehood, I am inclined to think there may be a grain of wheat in this bushel of chaff, and I am now trying to obtain more perfect information as this may refer to some interesting remains of by-gone ages. I will let you know hereafter of the result, but in the meantime it might perhaps be as well to ascertain whether there is any mention made of the ruins of this description among the transactions of the Society."*

Dr. Roer submitted an extract from a letter received by him from Mr. F. M. Dümmler, Berlin, announcing the despatch of 20 copies of Dr. Weber's edition of the Yajur Veda subscribed for by the Society, as also, of certain Oriental works published by him for exchange.

Ordered—That the amount of the Society's subscription for Dr. Weber's Yajur Veda be remitted to Mr. Dümmler, and the letter be referred to the Council for report at the next meeting.

From Dr. Von Martius, Secretary to the Physical and Natural History Section of the Royal Bavarian Academy, requesting a set

* Vide ante p. 283. Ed.

of the transactions of the Society for the Library of the Royal Bavarian Academy.

Ordered—That a set of each of the Researches and the Journal as far as available, be forwarded to the Academy, care of Mr. Rading the Agent of the Academy at Hamburgh, and the letter be referred to the Council.

The Librarian having submitted his usual monthly report, the meeting adjourned.

Confirmed, *5th April*, 1851.

J. W. COLVILE,
President.

LIBRARY.

The following additions have been made to the library, during February, 1851.

Presented.

A Geological Report on the Damoodah Valley. By D. H. Williams, Esq. London, 1850, 8vo. (2 copies).—BY THE GOVERNMENT OF BENGAL.

Report of the Geological Survey of India, for the season of 1848-49, comprising I. General Remarks: II. Geognosy: III. Description of plates and collections. By J. M'Clelland, F. L. S. Calcutta, 1850, 4to. (2 copies).—BY THE SAME.

Report on the Survey of Calcutta. By F. W. Simms, Esq. Calcutta, 1851, foolscap folio, (2 copies).—BY THE SAME.

The White Yajur Veda, edited by Dr. Albrecht Weber. Part I. Nos. 2, 3.—BY THE EDITOR.

Indische Studien. Zeitschrift für die Kunde des indischen Alterthums; im Vereine mit mehrern Gelehrten herausgegeben von Dr. Albrecht Weber. Zweites und Drittes Heft. Berlin, 1850.—BY THE EDITOR.

Madras Journal of Literature and Science, vol. XVI.—BY THE MADRAS LITERARY SOCIETY.

Journal of the Indian Archipelago for January, 1851.—BY THE EDITOR.

A Prize Essay on Hindu Female Education, in Bengali. By Tárásankara Sarmá.—BY BABU RAJENDRALÁL MITTRA.

Upadeshaka, No. 51.—BY THE EDITOR.

The Oriental Baptist, No. 51.—BY THE EDITOR.

The Calcutta Christian Observer, for March, 1851.—BY THE EDITOR.

Oriental Christian Spectator, for January, 1851.—BY THE EDITORS.

Tattwabodhiní Patriká, No. 90.—BY THE TATTWABODHINÍ SABHÁ.

The Meteorological Register kept at the Surveyor General's Office, Calcutta, for the month of January, 1851.—BY THE DEPUTY SURVEYOR GENERAL.

Purṇachandrodaya, Newspaper, for February.—BY THE EDITOR.

Purchased.

The Annals and Magazine of Natural History for December, 1850.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of March, 1851.

Date.	Observations made at Sun-rise.						Observations made at apparent noon.						Maximum Pressure observed at 9h. 50m.					
	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.
	Inches	°	°	°			Inches	°	°	°			Inches	°	°	°		
1	29.885	73.0	73.2	72.0	S.	Foggy	29.952	78.3	80.4	75.4	S. W.	Cumulo-strati	29.912	82.8	84.5	75.6	S.	Cumulo-strati
2S	.939	73.0	73.0	71.4	S.	Clear	.999	78.7	80.9	75.2	S. S. W.	Ditto	.966	81.4	82.8	75.2	S. S. W.	Ditto
3	.961	69.0	68.2	67.0	N. N. E.	Ditto	30.034	74.2	76.4	73.2	N.	Cumuli	.997	79.0	80.7	74.6	N. W.	Cumuli
4	30.015	74.3	74.4	73.0	W.N.W.	Cirro-strati	.069	78.0	80.4	75.0	N.	Cirro-strati	30.022	83.0	85.2	74.4	N. E.	Cirro-strati
5	.005	69.0	68.9	62.3	N.	Clear	.067	76.3	79.2	66.4	N.N.W.	Clear	.025	83.0	85.3	68.3	N.	Clear
6	.009	70.6	70.0	62.3	N.N.W.	Ditto	.062	75.8	78.9	66.4	N. W.	Ditto	.016	82.3	85.2	69.2	N. W.	Ditto
7	29.980	68.6	67.8	64.2	N.	Ditto	.042	76.0	79.2	68.8	N. W.	Ditto	29.991	84.0	86.3	68.6	N. W.	Ditto
8	.971	70.7	70.2	65.3	W.	Cirro-strati	.027	77.5	81.0	64.6	N.N.W.	Ditto	.981	85.2	87.2	66.4	N.N.W.	Ditto
9S	.953	69.3	69.2	66.0	N. W.	Cirro-cumuli	.024	77.0	80.0	64.0	E. N. E.	Cirro-cumuli	.991	84.0	87.0	66.7	E. S. E.	Cirro-cumuli
10	.934	71.6	71.5	66.6	N. W.	Ditto	29.988	78.6	81.6	67.3	N. W.	Ditto	.946	85.3	88.0	68.4	W.N.W.	Ditto
11	.897	70.6	71.0	67.3	N. W.	Ditto	.940	79.4	83.2	69.3	N. E.	Ditto	.901	86.4	89.0	70.8	W.	Cirro-strati
12	.871	73.6	73.6	70.5	W.N.W.	Ditto	.927	79.6	83.7	6.94	N. W.	Clear	.891	88.0	91.3	68.8	N. W.	Clear
13	.800	71.9	71.6	67.4	S. W.	Clear	.867	81.0	85.2	71.3	W.	Ditto	.821	89.7	93.2	72.6	S. W.	Ditto
14	.846	75.7	75.6	73.4	S. W.	Ditto	.918	81.6	84.2	78.0	N. W.	Ditto	.896	88.3	91.3	76.0	E.	Ditto
15	.831	75.3	74.9	73.0	S. S. E.	Ditto	.900	81.6	84.2	75.6	W. S. W.	Ditto	.850	86.7	88.6	76.8	N. W.	Ditto
16S	.797	75.8	75.3	67.3	N.	Ditto	.887	82.2	85.0	65.6	N.	Ditto	.840	88.4	90.2	67.2	N. W.	Ditto
17	.850	72.0	71.6	66.0	W.N.W.	Ditto	.928	80.0	83.9	68.4	N. W.	Ditto	.886	88.4	90.4	68.8	W.N.W.	Ditto
18	.914	72.2	72.5	69.9	N. W.	Ditto	.955	80.9	84.3	71.3	S. W.	Ditto	.905	88.8	90.7	74.3	S. W.	Ditto
19	.898	74.2	74.3	72.0	S. W.	Ditto	.946	81.3	83.8	76.5	S. W.	Ditto	.907	87.4	89.6	74.3	S. W.	Ditto
20	.809	75.4	76.0	74.0	S.	Cloudy	.841	82.0	84.4	78.5	S. S. W.	Ditto	.799	88.2	90.4	80.3	S. S. W.	Ditto
21	.708	77.6	77.3	75.4	S. E.	Scattered-clouds	.769	81.4	83.2	77.5	S. S. E.	Cloudy	.726	84.3	84.3	77.2	S.	Cloudy
22	.737	78.2	78.2	76.1	S. W.	Cloudy	.823	82.3	84.0	78.3	S. W.	Clear	.795	87.3	89.3	77.6	N.N.W.	Cumuli
23S	.825	72.8	73.0	70.8	S. W.	Clear	.885	82.0	86.0	74.0	S. S. W.	Ditto	.840	91.3	93.6	70.9	S.	Clear
24	.869	76.0	76.0	74.4	S. S. W.	Ditto	.925	82.0	84.6	77.4	S. W.	Ditto	.885	89.0	91.6	71.6	W.	Ditto
25	.880	77.6	78.0	76.3	S. W.	Cloudy	.945	82.6	85.0	77.5	S. W.	Ditto	.905	89.2	91.6	76.2	N. W.	Ditto
26	.907	76.2	75.6	74.0	S.	Ditto	.951	83.3	87.3	76.4	S. W.	Ditto	.901	91.8	95.0	75.0	S.	Ditto
27	.852	76.8	75.9	74.8	S. E.	Foggy	.948	81.4	84.0	78.3	S.	Ditto	.890	88.4	91.2	79.6	S.	Ditto
28	.910	76.3	76.5	75.0	N.	Ditto	.962	81.4	83.4	77.0	S. W.	Ditto	.944	88.3	90.6	75.3	S. W.	Ditto
29	.926	74.0	74.0	72.0	W. NW.	Ditto	30.008	80.0	82.0	75.2	N.	Cumulo-strati	.946	85.8	88.0	72.0	E. S. E	Ditto
30S	.907	74.6	74.8	72.2	W.N.W.	Cloudy	29.981	75.8	76.0	71.2	E.	Cloudy	.936	80.0	82.8	72.8	E. S. E.	Cirro-cumuli
31	.950	74.0	74.2	71.9	N.N.W.	Clear	30.011	80.3	82.3	75.0	N. E.	Cumulo-strati	.978	85.3	87.3	75.3	S. W.	Cumulo-strati
Mean	29.891	73.5	73.4	70.4	....	.....	29.955	79.8	82.5	72.8	....	.....	29.913	86.2	88.3	72.9	....	.....

[*Meteorological Register, continued.*]

Observations made at 2hs. 40m.						Minimum Pressure observed at 4 p. m.						Observations made at sun-set.						Maximum and Minimum Thermometer.				Rain Gauges.		Moon's Phases	Date.
Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Max.	Mean.	Min.	Max. Therm. in sun's rays.	Feet. Upper. 4.	Feet. Lower. 4.		
Inches	°	°	°			Inches	°	°	°			Inches	°	°	°			°	°	°	°	Inch.	Inch.		
29.835	86.6	87.6	76.4	S.	Cumulo-strati	29.825	87.3	87.3	76.3	S S W	Cumulo-strati	29.848	84.0	82.4	75.4	S.	Cumulo-strati	88.0	80.7	73 4	107.0	..	..		1
.874	85.3	86.0	75.3	S.	Ditto	.854	85.8	85.6	75.4	S.S. E	Ditto	.868	84.6	84.0	75.2	S. E.	Cloudy	86.8	79.9	72.9	105.6	0.94	0.98		2
.902	83.7	85.0	75 4	S.	Clear	.889	85.0	85.6	76.0	E.S.E.	Clear	.900	82.8	82.2	75.8	S. E.	Cirro-strati	85.9	77.3	68.7	107.3	..	..		3
.935	86.4	87.2	73.3	W.	Ditto	.916	87.4	88.0	72.6	N.	Ditto	.919	85.0	82.8	73.0	N. E.	Clear	87.8	80.9	74.0	110.4	..	..	●	4
.941	88.0	89.3	70.8	N.	Ditto	.918	88.8	89.4	70.2	N.	Ditto	.934	85.4	83.2	70.8	N.	Ditto	89.4	79.2	68.9	109.0	..	..		5
.934	88.3	90.0	68.0	N.	Ditto	.909	89 6	90.3	68.2	N.	Ditto	.908	85.8	83.2	79.0	N.	Ditto	90.4	80.4	70.4	108.0	..	..		6
.906	88.8	90.0	69.8	N N E	Ditto	.884	89.8	90.3	69.4	N. W.	Cirro-strati	.891	85 6	83.2	71.3	S.S.W	Cirro-strati	90.8	79.7	68.6	108.4	..	..		7
.890	89.5	90.9	69.0	w.s.w.	Cirro-strati	.873	90.3	91.3	69.0	N. W.	Ditto	.878	85.5	83.8	72.0	N.	Ditto	91.7	81.2	70.7	108.3	..	..		8
.904	89.3	90.3	68.6	w.n.w.	Cirro-cumuli	.892	89.7	91.0	69.7	W.	Cirro-cumuli	.894	85.5	83.8	71.2	W.	Cirro-cumuli	91.0	80.3	69.6	114.2	..	..		9
.865	90.3	91.6	69.2	w.n.w.	Ditto	.845	90.8	91.4	69.0	w.n.w.	Ditto	.841	87.8	85.3	71.4	W S W	Ditto	92.0	82.0	72.0	109 3	..	..		10
.834	89.5	91 0	70.4	w.n.w.	Cirro-strati	.823	90.4	91.4	69.9	W S W	Cirro-strati	.833	86.3	85.4	73.5	w.n.w.	Ditto	91.8	81.5	71.2	114.6	..	..		11
.788	93.2	94.0	70 2	w.n.w.	Clear	.764	93.6	94.0	71.0	S. W.	Clear	.754	89.5	87.4	73.3	S. W.	Clear	95.0	84.5	74.0	111.5	..	..	☽	
.737	95.0	96.4	72.5	S.	Ditto	.718	95.5	96.3	73.0	S. W.	Ditto	.733	90.4	88.3	73.5	S S W	Ditto	97.2	84.6	72.0	117.5	..	..		
.815	93.4	95.2	77.2	E.	Ditto	.790	94.3	95.3	77.1	E.S.E.	Ditto	.794	90.7	89.6	79.0	S. E.	Ditto	95.8	86.2	76.5	116.3	..	..		14
.764	92.3	93.9	79.2	W.	Ditto	.756	93.2	93.4	77.3	W.	Ditto	.763	90.5	88.9	77.4	W.	Cirro-cumuli	94.6	84.9	75.2	114.0	..	..		15
.762	91.6	92.8	68.4	w.s.w.	Ditto	.738	62.4	92.7	69.0	W S W	Ditto	.733	88.4	86.2	68.6	S.	Clear	93.7	84.6	75.4	113.0	..	..		16
.808	93.2	94.5	67.7	w.n.w.	Ditto	.791	93.3	93.6	67.3	w.n.w.	Ditto	.801	88.0	85.4	69.3	N. W.	Ditto	94.8	83.4	71.9	114.0	..	..	⊙	17
.836	91.8	92.6	71.0	SS.W.	Ditto	.823	92.2	92.2	70.3	S.SW.	Ditto	.832	88.3	86.6	73.4	S.	Ditto	93.6	83.2	72.8	113.7	..	..		18
.811	91.6	92.6	75.4	S.	Ditto	.785	92.0	92.0	78.4	S.SW.	Ditto	.793	88.3	86.3	71.4	S.	Ditto	93.2	84.0	74.7	112.3	..	..		19
.725	92.2	93.0	79.0	S.	Ditto	.703	92.2	91.7	78.4	S.	Ditto	.707	87 5	86.0	78.6	S.	Ditto	93.5	84.8	76.0	109.6	..	..		20
.658	89.0	89.4	79.8	S. W.	Cumuli	.626	88.7	88.4	79.0	S.	Cumuli	.615	84.0	83.3	75.4	S. shp.	Cloudy	90.3	83 9	77.4	105.0	..	..		21
.725	91.5	92.2	71.2	N. W.	Clear	.712	91.7	91.6	68.8	NNW	Clear	.716	88.2	86.3	68 0	NNW	Clear	92.0	85.5	79.0	107.4	..	..		22
.766	94.0	94 0	71.3	S.	Ditto	.748	92 9	92.3	74.2	S.	Ditto	.770	86.5	84.5	75.4	S S W.	Ditto	95.0	84.1	73.2	111.8	..	..		23
.790	94.4	95.5	70.0	w.n.w.	Ditto	.768	95.3	95.7	72.0	S.SW.	Ditto	.782	91.0	89.3	78.0	S S W.	Ditto	96 0	86.3	76.6	118.0	..	..		24
.831	95.0	95.7	71.0	W.	Ditto	.821	95.7	96.3	71.0	N. W.	Ditto	.835	91.3	88.7	74.0	N. W.	Ditto	96.3	87.2	78.0	114.4	..	..	☾	25
.814	96.7	97.6	74.2	w.s.w.	Ditto	.800	97.3	97.6	74.6	S.SW.	Ditto	.799	92.0	89.5	72.4	S.	Ditto	98.3	87.2	76.0	119.3	..	..		26
.810	94.4	95.8	74.2	S.	Ditto	.791	95.2	95.6	75.0	S.	Ditto	.803	91.0	89.3	77.2	S.	Ditto	95.6	85.8	76.0	114.6	..	..		27
.866	92.7	93 5	73.0	S. W.	Cirro-strati	.846	93.4	93.0	77.2	S.	Cirro-strati	.831	87.8	85.2	69.8	S.	Cirro-cumuli	94.8	85.4	76.0	113.3	..	..		28
.870	89.9	90.5	73.8	S. W.	Clear	.842	90.1	90.0	73.0	S. E.	Clear	.841	88.7	87.5	74.8	E.	Clear	91.0	82.7	74.4	110.5	0.06	0.07		29
.866	84.6	86 3	74.0	E.	Cirro-cumuli	.838	86.7	87.2	74.8	S. E.	Cumuli	.847	84.3	83.2	73.8	S.	Cirro-strati	97.6	81.3	75.0	107.5	..	..		30
.893	89.2	90.0	75.2	S. E.	Cumulo-strati	.872	90.2	90.2	75.0	S.SW.	Cirro-strati	.885	88.0	86.4	74.8	S S W.	Clear	91.1	82.8	74.4	110.5	..	..		31
29 831	90.7	91.8	72.7	....	.....	29.812	91.3	91.6	72.8	....	.....	29.818	87.5	85.7	73.4	....	.....	92.4	83.1	73 7	111.2	1.00	1.05		

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Brief notice of the Sil Háko or stone bridge in Zillah Kámrúp.—*By Major* S. T. HANNAY. *Communicated through Major* F. JENKINS, *Agent to the Governor General, by Captain* E. T. DALTON, *B. N. I. Assistant Commissioner, Assam.*

This bridge, a remnant of ancient times in Kámrúp, is situated about eight miles N. W. of Northern Gowhátty, on the high alley which, no doubt, formed at one time the principal line of land communication with ancient Gowhátty (Prágjyotisha) and Western Kámrúp, and is built across what may have been a former bed of the Bor Naddí, or at one particular season, a branch of the Brahmaputra; appearances now indicating a well-defined watercourse, through which, judging from marks at the bridge, a considerable body of water must pass in the rains, and at that season from native accounts, the waters of the Brahmaputra still find access to it.

The structure is of solid masonry, built without lime or mortar, of the same massive and enduring material (gneiss and granite) found in the neighbouring hills, and which appears to have been used so largely in the construction of the more ancient temples of central and lower Assam. There are no arches, the superstructure being a platform with a slight curve 140 feet long and 8 ft. in breadth, composed of slabs of stone, six feet nine inches long and ten inches thick, numbering five in the whole breadth, resting on an understructure of sixteen pillars, three in a row, equally divided by three large solid buttresses; with a half buttress projecting from a circular mass of masonry forming the abutments at each end of the road, there being in the whole length 21 passages for the water.

The buttresses are all after the same model, those in the centre measuring (at a level with the water and as near as I could ascertain one layer from the foundation) about sixteen feet ten inches in breadth by eight feet ten inches in thickness, tapering in regular layers of masonry with rounded corners to 3 feet thick and 8 feet broad at top; on which is laid a slab of the same breadth supporting those of the platform. The pillars spring from a base of very massive material and measure at a line with the water twelve feet four inches in breadth by 4 feet 4 inches in thickness, gradually diminishing in receding layers to the height of 3 feet 4 inches, from which rises the abasement of each pillar, the first stone being a squared block of 2½ feet, upon which rests another block 2 feet square; the average thickness of the shaft; the remaining portion of which is octagonal shaped. The two first octagonal blocks have a large slab across them, and upon this rise two, three and four blocks according to their size and the difference in height towards the centre of the bridge, the upper one being formed into a round capital, and over the whole is placed a slab similar to that which covers the buttresses. The height at the centre of the bridge by measurement with a line to the level of the water is nearly 20 feet, there being a difference of 2 feet between this measurement and that of the spring of the platform at each end.

From the great care taken in the chiselling, squaring and fitting up of the component parts of the whole, as well as the great size and weight, the work is one of great strength and solidity. And this accounts for the good state of preservation in which we find it in the present day: for with the exception of the masonry of the abutments at each end, in which large trees have taken root (one of them a tamarind tree the stem 16 feet in circumference) and displaced the stones, the rest of the structure may be said to be entire. From a fracture in one of the pillars, I observed that the upper blocks were kept in their places, by means of iron pins, firmly wedged into the lower ones; four apparently through the centre and one on each side of the square of the shaft, and, although not visible, other portions of the work may be iron clamped; the slabs of the platform were marked with clamping holes, and on the edge of the outside slabs are three square holes (3 inches square) which were no doubt intended for the wooden supports of a balustrade. Several freize-carved blocks are also lying near the end abutments,

from which I imagine the entrance of each may have been ornamented, or there may have been gateways.

The design and style of architecture of this bridge, evidently belongs to a remote period in the annals of Kámrúp, and in its original structure at least must be co-eval with the erection of the ancient Brahminical temples, the remains of which are found so widely scattered throughout the length and breadth of Assam ; the works of its former Brahminical kings, a race long ago extinct in the annals of modern Hinduism, and of whom the present race in Assam know nothing.

That Kámrúp had for a long period a dynasty of Brahminical kings there can be little doubt, on the authority of both Buchanan and the Chinese pilgrim Hwan Tshang who visited India in A. D. 629, 642. The former quoting the Yogini Tantra, a work which treats of ancient Assam, states under date that the worship of the Lingas commenced in the 19th year of *Saka*, that at an indefinite period afterwards it was further extended by a Brahman of the Korotoya river who became king, by name Nogo Songkar and whose dynasty continued probably until the time of Hwan Tshang's visit as he mentions the name of the then reigning king a Brahman (Vide Captain Cunningham's Itinerary of the Chinese Pilgrim Hwan Tshang in the J. A. S. B. for July, 1848, page 40), and that Buddism according to the doctrines of *Sákya* or Guadama had not extended into Kámrúp, the people of which were heretics, and possessed the doctrines of the Sutarus of the Vedas, by which it is presumed he means Brahmanism or more likely the worship of *Iswara* as the Supreme Lord, which in these remote times was adhered to by Brahmans, and who had not adopted the doctrines of Gaudama. This Brahminical dynasty may have continued for a century longer, when the country was overrun, and became disorganised by the invasion of Lallitáditya king of Cashmere, and the ancient religion perhaps never got re-established, and about the year 840 according to the tradition of the Cássorís (the Racchas of the valley) that tribe assumed the government of the country, and held it until the 10th or 11th century, when they were drawn out by an invasion of a power from India, bringing in its footsteps that modern Brahmanism, which had a century before driven from India the doctrines of *Sákya* Muni.

The accounts by Mohammedan writers of the earliest conquests of

Kámrúp by the subordinates of the Moslem kings, appear to be mixed up with so much of the fabulous (Vide the late Major Fisher's account of Cachar, Sylhet, &c. No. 104, J. A. S. B.), that it is quite impossible to place much reliance on them as historical records; if however, we could suppose that the expedition of 1205 to 6 as above quoted, came in sight of the Brahmaputra at Ráng'ámátí crossed the Monás and marched through Northern Kámrúp, the possession of which would oblige the Rájá to submit, it is not improbable but this is the stone bridge over which Bactyár Khilji and his Tartar cavalry passed, previous to entering the outworks of the ancient city of Gowhatty (or Prágjyotisha), the bridge being but a short distance from the line of hills bounding Gowhatty on the North N. W. and West, on which are still visible its line of defences extending for many miles on each side from the N. W. gate of entrance or pass through the hills.

The Mohammedan general is also said to have been obliged to retreat from an advanced position (perhaps Chárdoár) hearing that the Rájá of Kámrúp had dismantled the stone bridge on his rear; now it is quite evident from the marks on the stones of the platform, that they had been taken off and replaced somewhat irregularly.

Note. The king in whose time the worship of the Linga commenced was styled Devyswar, and by the Bráhman who has compiled the Yogini Tantra, a modern work pretended to be the prophecies of the great Siva himself of events to come to pass in Kámrúp, he is said to have been of the Sudra race, but it is likely he may have been of the ancient race of the Devas and Duttas who reigned supreme in ancient "Mithila" of which kingdom Kámarúpa was a dependency if not a portion, and his proper title *Devasa* as written in the old character of the inscription on certain coins found near Jyonpur, translations of which were published in No. 84, Vol. 7, Plate 60, J. B. S.; and this might account also for the *Debasa* or Devasa of the maps of India of the same century, the position appearing to correspond with our modern Kámrúp and Cháridoár. Kámarúpa at that period included the hills as far as Kaonjegiri now under the Deb Rájá or Bootan.

A sketch of the Behar Mica Mines. *By Capt.* W. S. SHERWILL, *Revenue Surveyor.*

The principal Mica mines of Behar, are situated on the Northern face of the Vindhya hills, where the three districts of Behar, Monghyr and Ramghur meet. The most westerly-situated mine is thirty-seven miles in a south-easterly direction from Gya, and is in the district of Behar; the most easterly mine is about sixty miles distant in zillah Monghyr; the whole of the intermediate sixty miles being more or less productive of the mineral. The average distance from the Ganges of the whole aggregated group of mines is sixty miles.

Those mines only which lie within the boundary of the district of Behar are worked, those within the district of Monghyr, from some unknown reason, are neither worked nor regarded as of any value by the owners of the estates in which they lie.

Rajowlí, a small village, in Pargannáh Jarráh, of Zillah Behar, is the great mart for the mineral, and the spot whence it is dispersed to all the great markets on the Ganges: this village is situated on the left bank of the Dhunarjeh Nalláh, which stream, together with the Tillyá Nalláh, unite four miles south of Rajowlí, flow from the southern hills in deeply wooded valleys, and completely intersect the mines. The beds of these streams, the roads through the passes, and valleys, and indeed the whole surface of the country around the mica formation, sparkles with the bright mineral.

Leaving Rajowlí and proceeding four miles in an easterly direction, a deep wooded valley is entered, situated amongst and surrounded by quartz hills; through this valley, in the rainy season, a mountain torrent descends with great violence bringing with it great quantities of mica. After ascending the course of the torrent for about a mile, the valley terminates in an amphitheatre of low jungle-covered hills; the soil forming the superficial covering of the country is composed of a harsh dry gravel, composed of quartz, schorlaceous schist, detached and silvery mica; through which soil are seen protruding huge, naked masses of quartz and gneiss, the latter both plain and garnetiferous. In the beds of the torrents, bushels of minute garnets may be gathered

but from their very insignificant proportions, they are quite useless. A very beautiful schorlaceous schist, consisting of crystals of schorl of a delicate fineness, embedded in mica, as well as larger crystals of raven black schorl, varying in size from that of a finger to that of a man's arm, embedded in a bright glassy quartz and affording by the contrast of the two minerals a very beautiful object, are found in great abundance; such is the nature of the minerals in the immediate neighbourhood of the mines, which are always opened in low detached hills. The mica appears in amorphous masses varying from a few inches square, to four feet in length, embedded in an incoherent soil composed of schorl and comminuted silvery mica, the whole mass filling up extensive interstices between large and widely separated quartz rocks.

The mode of opening a mine is as follows: a small and convenient hill having been chosen as the spot for commencing operations upon, a party of the wild hill tribes, named Bandáthís, the members of which party have freely propitiated the local tutelary god or goddess, both by sacrifice and by getting very drunk, ascend to the top of the hill and commence sinking a series of pits, the whole way down the profile of the hill, about three feet in diameter each, and a few feet apart. These pits are not continued vertically downwards, but in a zig-zag shape, but nevertheless not so much out of the vertical proper, as that a basket containing the mineral cannot be hauled up from the bottom of the pit to the top; the zig-zag shape of the shaft being formed by sinking the shaft, first inclining to the left a few feet and then to the right a few feet, the head of each cut or notch forming a landing-place or step, and thus the necessity of ladders is obviated; the projecting of salient angles of the notches forming a perfect flight of steps from the top to the bottom of the pits, which seldom reaches to a greater depth than forty feet, when darkness interfering with the workman's progress, the pit is forsaken and another commenced upon a few feet further down the hill. A slight frame-work of faggots cut from the neighbouring trees, is placed over the mouth of each pit, upon which a man sits, waiting till the signal from below is given to haul up the basket containing the mica and rubbish, which has been dug from the sides of the pit by the aid of a rude pick. On arrival at the surface the good and bad materials are separated, the earth and

rubbish are shot down the precipitous side of the hill; the good mica which arrives at the surface of the pit in ragged masses about one foot six inches in length, six inches broad and three inches in thickness, after having its ragged edges trimmed off with a reaping-hook-looking instrument, is placed by itself in a heap, and the bad or refuse, that is the softer kind, is also placed aside in a heap by itself.

The mica reaches the surface in three different states, viz. the good, hard and seviceable mineral; the soft, wet and flimsy mineral; and the chipped and powdered mineral.

The tests as to whether the mica is good for any thing, or whether as the natives say "*it is alive*" are its firmness, specific gravity, and the power of reflecting the countenance free of contortions; the latter test I imagine showing the perfect parallelism of its individual plates, and consequent likelihood to split well; the heavier the mineral and the more perfect the reflection, the more valuable is the mineral considered; all the plates not standing the necessary test, are of a soft and flimsy nature without any of the brilliant sparkle of the better sort, the natives call this the "*dead mica*," and it appears to be in a state of decay.

The plates of the superior kind are used in all the large gangetic cities and towns, by the native draftsmen, whose beautiful productions in body colors, must be familiar to most people; by the lamp and toy makers; by the Mohammedans for ornamenting their Táziáhs; as well as for ornamenting umbrellas, boats, and for making artificial flowers.

The second and third kinds are pounded and used for ornamenting toys, pottery, the inside of houses, for sprinkling over clothes and turbans at feasts, the sparkle from which by torch light resembles diamonds; but the great consumption of the inferior mineral takes place during the Hooli festival, during which period the "ábeer" or pounded mica mixed with the flour of the small grain, "*Kodo*" and colored with some red coloring matter, is freely sprinkled over the maddened and intoxicated votaries of those bacchanalian orgies.

The mines are worked by Mahájans or native merchants, who reside at Patna and depute agents to the spot to superintend the mining. The excavators or miners are Bandáthís or inhabitants of the hills, a race allied to the Kols, Bheels and Sonthals; they are a wild-looking

set of demi-savages, slightly clad, the forepart of their head shaved, the rest of their hair standing up in wild curls; they have the high cheek bones, thick lips and small eyes of the Vindhyan races; they are also a hard-working and merry race. The miners receive as monthly wages one maund (80 lbs.) of rice, and a piece of cloth, the whole valued at two rupees.

The mines are worked during the months of January, February and March only; for during the hot months or from the latter end of March or June the great heat dries up all the water for many miles around the mines, and during the rainy season the pits fill with water; and subsequent to the rains the unhealthiness of the dense miasmatic jungles in the neighbourhood, prevent the work commencing before January.

During the three working months, about four hundred maunds or fourteen tons of mica, yielding upon calculation 20,000,000 transparent plates of mica, each plate being about nine inches square, are conveyed away to Patna upon pad bullocks, the whole being valued at 4,000 Rs. (£400.) To obtain larger plates than are generally exported, does not seem to be an object with the agents, who by their constantly urging the miners to wrench out the mica from its matrix, whether in large or small pieces cause about three times the amount of mica actually carried away to be destroyed in the mines. The head Bandháti assured me that were time allowed him, he could produce plates of almost any size.

The largest plates are dug from the Deilwar mine where the miners have hit upon a seam of mica, running along the base of one of the small hillocks; it is thus worked in the open air only a few feet from the level of the country; this seam however will be soon lost as the half wild miners have no idea of propping the roof of a mine which must very soon fall in by its own weight.

Examination and Analysis of the SHALKA METEORITE *(Zillah West Burdwan). By* HENRY PIDDINGTON, *Curator Museum of Economic Geology.*

The following details are a proper introduction to an account of this valuable addition to our Museum.

It was about the 15th January that Major Hannyngton, Agent for the Governor-General S. W. Frontier, called at the Museum with a very minute specimen of an ash-coloured mineral, which had all the appearance of a fragment of a Meteorite, and which I pronounced at a venture to be one, and he told me it was so, referring to Dr. Cheek of Bancoorah for further information.

To Dr. Cheek, who has frequently obliged me with storm Reports, I wrote by the same evening's dawk, requesting the favor of a larger piece of the stone with the crust; and we shortly had a fine large specimen sent by dawk, which fully shewed without the necessity of an analysis that it was a true Meteorite. Mr. Colvin was so good as to oblige me with a private letter to Mr. Mactier, and our late Secretary Capt. Hayes also wrote officially to that gentleman, to whom I took the liberty also of forwarding, with Mr. Colvin's and the Secretary's letters, a series of 22 queries for the examination of witnesses to the fall of the stone, embracing most of the points which, on so hurried a call, occurred to me as important, or likely to suggest others which might be so; for there was, I knew, no time to be lost; as the natives invariably carry off Meteorites for charms, objects of worship, &c.

To Mr. Mactier the Society are greatly indebted, for he took the pains to go personally to Bishenpore, a distance of ten miles, and the results of the replies obtained will be seen following the different questions framed by him upon my queries and forwarded to the Society in Bengalee, and in the letter from Mr. Mactier as printed below.

Examination of witnesses before Mr. MACTIER. *Translated by Babu* RAJENDRA LAL MITTER, *Librarian Asiatic Society.*

On the 24th of January, 1851. Bengali 1257, 12th Magh.

RAMBIRA, son of BOLAI of the Rajput caste; inhabitant of Sáluka, Ætat about 35 years, profession, formerly a peon of the Purulia collec-

torate, and *Bhuban* Bágdi, son of Kugan, of the Bagdi caste; inhabitant of Pechnápur, Ætat about 60 years, by profession a Chowkidar.

Question.—State what you know of the stone which fell from the sky?

Between the 10th and 20th of Agraháyana,* one night when about a fourth of the night had yet to elapse, I heard a rolling noise *(gur gur)* which awoke me from my sleep; but on my coming out and enquiring about the cause of it, I could ascertain nothing. The following morning about an hour and half after day break, proceeding to superintend the reaping of my paddy, I found in the paddy field of Náráyana Pála, to the South, and about 180 feet beyond the village of Sáluká, (Shalka,) that a stone, about one cubit wide, had fallen and broken to pieces. Those who came from a distance to see the stone carried away fragments of it. It was first seen by Bhuban Bágdi, Chowkidar.

Bhuban Bágdi. I serve as a Chowkidar of the village of Sáluká. Between the 10th and 15th Agraháyana of the current year, one night when two and half quarters (prahara) of it had passed when a quarter (?) of it had yet to elapse (i. e. at 1½ A. M.) a stone fell crashing on the earth, with a crackling noise (*char-char pur-pur*) about 160 to 240 cubits to the south of the village. Not wishing to go during the night I proceeded the next morning to the place, and found that a pit had been formed there, and fragments of the stone were lying about it; the stone was covered with earth, i. e. with loose earth.

I called the people in the field and told them "Look at this, it has not been dug by bears nor men." The paddy-reapers, seeing the fragments and the large stone covered with earth, observed that the stone must have fallen when the sound was heard the night preceding, and went their way, some of them taking away the fragments, and stating this must be a Debta, do not (MS. uncertain).

Q. to *Bhubun.*—When you heard the crackling noise, did you see any flame or lightning, and was any wind blowing at the time?

A.—The sky was illuminated with lightning.

Q. No. (10).—to *Rambir.*—Did you observe any light at the time?

A.—*Rambir.* I observed none.

Q. to *Bhuban.*—How far were you from the pit when the stone fell?

A.—*Bhuban.*—Between 2 and 3 *rosis* (180 to 240 cubits). I ran towards the huts of the Mugs.

* 25th Nov. to 5th Dec.: This is a purely Indian notion of a date.

Q.—Rambir.—Was there only one stone or a number of stones ?

A.—Rambir.—One stone fell and broke into many pieces.

Q. (8).*—Were stars visible at the time when the stone fell ? and what was the appearance of the sky ?

A.—Rambir.—The sky appeared as usual and the stars were visible.

A.—Bhuban.—The sky was as usual.

Q.—(9).—What sort of noise did you hear ?

A.—Rambir.—Like the rolling of clouds.

A. Bhuban.—A rolling noise (*gur-gur*).

Q.—(12).—When you saw the stone first, was it hot or cold ?

A.—Rambir.—Cold.

A.—Bhuban.—It was not hot, it was cold.

Q. (13).—Did the stone burn the grass or anything else about the place where it fell ? or dry up the ground about it ?

A.—Rambir.—Neither grass or any thing else was burnt, nor did the ground dry up.

Q. (15).—Was there any smell to the stone when you first saw it ?

A.—R. and B.—None.

Q. (16).—How was the stone lying at the time when you first saw it,—lying flat ? or in a slanting position ?

A.—Rambir.—In a slanting position ; when the ground around was dug the stone appeared in a slanting position. It appeared as if it fell from the South (witness here described the angle made with the ground to be about 45°).

A.—Bhuban.—It was slanting, I think it came from the South.

Q. (19)—Has the colour of the stone changed, since you first saw it ?

A.—R. and B.—As it was then so is it now. No change of colour has taken place.

Q. (20).—What was the state of the weather on or before the day the stone fell ?

A.—Rambir.—As usual.

A.—Bhuban.—As now.

Q. (21).—Did you ever hear of any stone of the kind having fallen before ?

A.—Rambir.—Nothing of the kind has been heard.

A.—Bhuban.—I have heard nothing.

* These numbers refer to those in my draft of queries. H. P.

Q. (22).—From which quarter was the wind blowing at the time?

A.—Rambir.—I took no notice of it.

A.—Bhuban.—There was no remarkable wind at the time.

Q. to *Rambir.*—When the Joint Magistrate of Gurbeta ordered to dig out the stone, how low did you dig?

Rambir.—I dug two cubits, or one cubit and a half.

To *Bhuban.*—How deep was the stone dug for?

Bhuban.—About two cubits

Q.—When you first saw the stone, how high was it from the ground?

Rambir.—On a level with the ground.

Bhuban.—It had entered about a cubit and a half below the ground; it was covered with loose earth.

Q.—When the stone was dug out, was it found in one entire piece? or in several pieces?

A.—Rambir.—There were large and small pieces, but I was not present at the time; I went away to my work.

A.—Bhuban. One entire piece was found.

Q.—to *Bhuban.* Did any body else beside you see the stone fall?

A.—No body else was present: none saw it.

Q.—When you saw the lightning was there any light on the ground?

A.—Bhuban. None.

Q.—When the lightning appeared, why did you run away?

A.—Bhuban. The rolling noise frightened me, and dreading lest it should fall on me, I ran towards the village of Saluka.

Q.—How did the lightning appear?

A.—As usual.

Q.—What was the weight of the stone, together with the fragments?

A.—The small fragments remained behind; the large mass was taken away by a Burkandaj from Bishenpur. I cannot say its weight.

Q.—You have already said that there was no cloud, but only lightning. Did you examine this carefully?

A.—Yes, I examined carefully and found no cloud.

The following replies are in answer to Nos. 3, 4, 5 and 7 of my queries, and are given in English by Mr. Mactier.

3. Where did it fall? describe the spot exactly.

In the middle of paddy fields surrounded by cultivation on all sides, the ground for some distance sloping down from N. to S.

4. What kind of ground did it fall upon (send a good specimen of the soil) and describe it particularly as to rocks, or stones or alluvial or arable land?

A specimen accompanies—no rocks or stones near; in the middle of *paddy khets.**

5. How far from any water?

30 yards from a small tank (about 4 cottahs in extent.)

7. What became of the other pieces? (If any small ones can be found near the spot like it, or with a black crust, send them.)

Carried off by persons from all parts of the country who came to see the stone.

The following official letter from Mr. Mactier to the Secretary of the Society gives a summary of this evidence, and his own account of the locality and impressions on the subject.

To the Secretary of the Asiatic Society of Bengal.

From the Officiating Joint Magistrate of Zillah Bancoorah.

Dated Bancoorah, 28th Jany. 1851.

Sir,—Under orders from his Honor the Deputy Governor of Bengal, I have the honor to forward part of a meteoric stone which fell early in the morning of the 30th November, 1850, corresponding with 16th Aghran 1257, B. S.

2. I have the honor to forward two depositions given by persons residing near the spot, one, the chowkeedar, being the only person who was out of doors when the stone fell, and at the same time to add the result of my own enquiries among the inhabitants of the neighbouring villages and a description of the locality.

3. The hole from which the stone now sent was dug, is situated about eighty yards due south of the village of Shalká;—immediately surrounding the spot are paddy fields and the spot itself is on the northern edge of a small paddy *khet* about 4 cottahs in extent. The village of Shalká contains about 20 houses and huts; 3 or 4 moderately sized trees grow close to it; beyond the village the paddy cultivation, with occasional tanks, stretches to the N. for about a mile and ½ till it is terminated by low jungle. About 30 yards to the north-east of the spot is a small tank (Beng-dhobá) about 4 cottahs in extent

* *Anglice*, Rice fields.

at the S. W. corner of which is a tamarind tree. To the east is paddy cultivation terminated by the houses of Bhorah-Dharmpúr about ¾ of a mile off. From east to S. W. is a large cultivated (rice) plain, bounded by the villages on the immediate bank of the Dalkisher river, which is distant from the spot 4 miles in direct line. About ¼ of a mile to the S. W. is a tank, beyond which is low jungle extending W. b. N., and due W. distant 250 yards is the jungle abovementioned, and to the N. of W. distant 100 yards, is another small tank, between which and Shalká are paddy lands. The ground slopes downward considerably from N. to S. A specimen of the soil in which the stone fell is sent, the stone being embedded in it. At the time of the fall it (the soil) was in the state of mud. I observed that the banks of tanks near the spot were composed of Kanker. I conclude therefore that the stratum immediately under the soil in cultivation is Kanker.

4. On the night on which the stone fell as well as for some days previous and subsequent thereto, there was nothing to be remarked in the state of the weather, the temperature was seasonable, very little wind and the sky clear, no clouds being visible.

5. About 3 hours before sunrise a clap of thunder was heard, accompanied (Vide the Chowkeedar's evidence) by a flash of lightning. Statements were at variance as to the nature of this noise, some persons saying, it in no ways differed from ordinary thunder, others, that they recognised with it, a whirling noise (*gur-gur shabda. Beng.*) The noise does not appear to have been extraordinarily loud, as persons in the village of Bhorá about ¾ mile off were not awakened by it.

6. The ryots on going to their fields in the morning, observed the earth ploughed up, they at first thought it had been made by a bear, or by some of the low castes in digging out grain from the rat-holes,* but on looking further they saw fragments of the stone scattered on all sides withiu a radius of about 20 feet, and the stone itself embedded in the soil, but with no part projecting therefrom. The color was then what it now is, it was cold to the touch and had no smell. The Chowkeedar it is to be observed, states that after the flash he saw nothing burning on the ground. The stubble and grass was not scorched nor the ground dried up. As with the specimen now sent is the earth in which it was embedded, the Society will be enabled to test these statements.

* A common practice in India.

7. All agreed in stating the stone to have come from the south, but the angle it made with the earth is variously stated, from 45° to 80°. This is easily accounted for, as no portion projected out of the earth. The Talookdar of the place, by name Gopal Mundle, the most intelligent of the observers had a tent peg driven in so as to represent the course of the stone in the earth (he having been present when the stone was dug out) from which, supposing the course of the stone not to have been altered after first contact with the earth, the angle made with the earth would be nearly 80°.

8. The greater portion of the stone having been carried off I was unable to obtain exact information as to its size; the portion now sent, and it is that furthest embedded, was dug 3 feet from the surface, and as pieces of the stone were dug out continuously from the surface, the stone itself being, though embedded, shattered, it must have been apparently upwards of 3 feet long.

9. No occurrence of the sort has ever happened in this part of the country.

10. I regret I have been unable to send more numerous depositions. I was pressed for time, and there is always great delay in such cases in distinguishing hearsay from direct evidence; numerous persons presented themselves very willing to tell all they knew, but after a little questioning it appeared their knowledge was obtained from others. I took therefore the depositions of those apparently best informed. Any other particulars which may be required I shall be happy to do my best to obtain for the Society.

11. I may mention that the people on the spot said, that on the same night a stone had fallen at or near the village of Kúchat in the Burdwan district.

(Signed) T. W. Mactier,
Offg. Joint Magistrate.

There are some points of resemblance between the circumstances attending the fall of this meteor, and that of the Cold Bokkevelde stone at the Cape, as described in the 82nd and 83rd vols. of the Philosophical Transactions by Sir John Herschell's correspondents, and which are also common to the few accounts we have of the falling of these stones by persons near the spot. We find that at Shalká as at the Cape, the air was calm and the sky clear, at the time of the fall of the

stone; there was also a rolling noise,* sufficiently loud to alarm the witness who heard it though not amounting to the explosion which accompanied the Cape meteor.† It will subsequently be seen that, though the witnesses give us no evidence to that effect, the stone was doubtless hot when it fell. The angle of fall seems to have been between 45° and 80 with the horizon. With regard to the second stone said to have fallen on the same night, I wrote to Mr. Patton, the Civil and Session Judge of Burdwan concerning it, and he has kindly caused every enquiry to be made, but cannot trace any truth in the report. It is not, however, improbable that the natives of the vicinity having carried off the whole of the stone may have leagued together to deny that any fall took place, fancying that they might be brought into some trouble now that the *Hoozoor*‡ was enquiring about it.

So far as to the circumstances attending the acquisition of the Meteorite and the evidence of the facts connected with its fall, I now proceed to describe what we have received, and to remark upon some physical peculiarities, reserving the description of the stone as a mineral for the chemical part of this report.

We have received two large lumps of 2 or 3 lb. each, with 2 or 3 lbs. of smaller pieces and fragments, and perhaps half a pound more firmly embedded in the earth sent with the specimen. This is, of course, all Mr. Mactier could rescue from the natives who, it appears, have carried off the greater part of it, as they always do, for religious, medicinal and superstitious purposes. We were thus not an hour too soon in our

* The imitative Bengalee word is such as would be used to express the loud rolling of heavy hail clouds, or something between distant musketry and low thunder.

† I have not seen it noticed that one of the oldest and best detailed descriptions of the fall of a Meteorite, is found in Virgil; Æneid B. II. l. 692. I copy here the passage, which Virgil probably wrote from some account which was then extant.

"Vix ea fatus erat senior, subitoque fragore
Intonuit lævum, et de cœlo lapsa per umbras
Stella facem ducens multâ cum luce cucurrit.
Illam, summa super labentem culmina tecti,
Cernimus Idæâ claram se condere sylvâ,
Signantemque vias; tum longo limite sulcus
Dat lucem, et latè circum loca sulfure fumant."

‡ *Anglice.* The chief authority.

claim for a share of it. Almost the whole of the pieces which formed any part of the exterior of the Meteorite (as known by the usual black crust) have surfaces more or less curved, shewing that it must have really been as described of very considerable size, though it evidently broke into pieces on reaching the earth.

For, in compliance with my note to query No. 4, Mr. Mactier has most obligingly sent us a large mass of the earth in which the stone embedded itself on its fall, and this is almost as great a curiosity as the stone itself, as will presently be seen.

This mass of earth in its extreme dimensions is about a foot long and a foot broad. It contains two cavities, being the marks of two large curvilinear masses (like great shells) having fallen close to each other; and these are divided by a rough ridge about two inches across at its narrowest part. At the side of one of these spherical, or rather curved cavities, a mass of perhaps half a pound of the shattered stone, 7 inches long by 2½ broad, is firmly embedded, and on examining the cavities themselves several black specks are seen here and there, which the magnifier shews to be parts of the external crust detached from the stone and adhering to the earth!*

The question as to whether the stone was hot or cold at its falling seemed to me at first, as it will seem to every one, settled in the negative by the replies, but a close examination of the state of the earth in the cavities has induced me to change my opinion, and I feel now satisfied that the stone, if not red hot so as to burn and scorch the grass or other vegetation† was sufficiently hot to scorch slightly the soil on which it fell, for not only is the interior of the cavities slightly altered in colour, but upon examination with the magnifier at the edge it is seen to be burnt to a thin film of a yellowish white colour. The whole has exactly (and this to Indian readers will be a familiar comparison) the appearance of part of an old native *chula*.‡

* I need scarcely add that this invaluable specimen has been carefully preserved in a glass case made on purpose for it.

† It seems to have fallen upon bare land of some sort, for there is not a trace of any grass, or of grass roots, about the large lump of earth we have.

‡ Earthen cooking place, portable or fixed, which by long use becomes of a dirty yellowish white colour where the fire is strong.

II.

Mineralogical and Chemical Examination.

Description.

The stone is mainly composed of two distinct minerals, exclusive of the external crust. The first of these is a light, ash-grey, soft mass, very harsh and friable, like soft, friable ash-coloured sand-stone, or pumice, which sometimes runs in narrow whiter bands through the mass. This ash-grey mass is thickly studded with specks and masses of all sizes of a much darker greyish black mineral which has often a bright metallic glance, and sometimes on the polished surfaces a silvery lustre like some varieties of Diallage. Its powder is of a very light ash-grey.

Internally the darker mineral appears loosely aggregated, and sometimes slightly striated on the smoother surfaces, like minute fragments of grey schorl; and in the fractures fibrous and radiated like some varieties of hornblende or actinolite. Its powder exactly resembles that of the lighter coloured portions of the stone.

The light, ash-grey mineral has also interspersed in it numerous black shining specks, which to the magnifier in a bright light have the bright glance of broken particles of black coal, or pitchstone; the black colour being somewhat bronzed in a strong light; these assume all shapes, and are sometimes partly globular like melanite garnets. They rarely exceed in size a hempseed, but have at times a semi-crystallised appearance and are sometimes agglomerated into minute carbonaceous looking nests.

Minute masses, of a very pale green, like olivine, are seen imbedded in the dark grey masses above described, and some of these, particularly at those parts of the stone which are but loosely aggregated, are seen upon very close inspection by the magnifier to be a sort of olivine-looking slag; that is the mineral runs into a pale olivine-like glass, as if it was in the act of crystallizing into olivine, or the olivine was in the act of fusing to a rock. It is not, however, olivine but merely silicate or silico-chromate of iron; the entire absence of magnesia wholly excluding it from the class to which olivine belongs.

The Crust.

The black crust is in most parts closely adherent, but in some few

very loose,* and can easily be detached. It is sometimes, too, of the thickness of thick foolscap or thin drawing paper, which I do not recollect to have seen before noted. It is of a dusky iron black with marks of fusion in many places, and of the black granules being fused into it. It also gives the usual metallic streak. When the internal part of a detached piece of the crust is examined by the magnifier it is seen to be rough and granulated, with some bright metallic-looking specks, but these not distinctly crystallized.

Texture and Coherency.

The state of aggregation of the different parts of the stone is curious, and, from the fragments we have, we may say, generally, that externally for two inches or more, and sometimes as much as three inches, it was in general tolerably compact, so as to bear such polishing as its pumice-like structure will take; but that internally it runs to a coarse agglomeration of small irregular fragments, such as one sometimes sees in coarse gravelly clays when dried. This part is so little coherent that fragments of the stone must be lifted and handled with the greatest precaution not to lose some grains of it, and some will even fall off when carrying a specimen gently from place to place.

We may thus assume that the stone, as a mass in the atmosphere, was fused at its surface to a crust, with a coherent sandstone, or solid pumice-like shell, and internally was a mass of agglomerated grains only!† and this accounts for the stone's shivering itself to fragments by its fall. The loosely coherent state of the more central parts would seem to lend some corroboration of the hypothesis that these bodies are formed in the atmosphere and not ejected from, or the debris of other planets.

Taste and Smell.

It adheres strongly to the tongue, like pumice, in the grey ashy parts, but less so at the darker ones. Its smell when breathed upon is earthy and slightly bitter.

It is harsh to handle, and excessively friable and grating when one piece touches another.

* Perhaps from sudden cooling?

† If it were possible to get a section of these, or to grind down a surface of them, they would, I doubt not give a sort of Widmannstattenian lines like those shewn on meteoric iron; to judge at least by the fracture.

Specific Gravity.

The specific gravity of a fair average specimen, with some crust attached, and which was allowed to part with all its air bubbles was 3.36.

Magnetism.

The black crust only is magnetic. The ash-grey and darker masses are not so, nor do the black grains affect the magnet.

Blowpipe.

The ashy grey mass. In the forceps becomes of a dark greenish brown colour, but does not fuse.

Upon charcoal the same, but the colour is not so deep.

With borax a small splinter partly dissolves, colouring the glass a light grass green colour, and leaving a small dark fragment which does not dissolve.

The *powder with borax on platina wire* dissolves completely, giving a pale or deep grass-green bead according to the quantity employed.

The powder of the darker black mineral is exactly of the colour of the light ash-grey parts.

With borax on the platina wire gives a bright golden grass-green bead which by reflected light has somewhat of an emerald green tinge. Hence I presume that this part contains chromate of iron dispersed in it, in minute quantities, and indeed it appears in some places to run into the black shining specks of chromate of iron above described.

Small pieces digested for a long time in Nitro-Hydrochloric acid. The solution becomes highly coloured with iron, and a little siliceous powder is detached; but the mass undergoes no farther alteration at the time. After some days however the fragments, after being washed clean and exposed to the atmosphere, are covered with a light greenish yellow coating, shewing that the iron at the surface has passed into the state of the hydrated protoxide.

The Black Grains.

Examined by the magnifier, these are on the fractured surface of a greenish black colour, with a semi-metallic appearance like brilliant fragments of coal; some of the grains, none of which exceed a small

millet or hemp-seed in size, have an imperfect garnet-like (dodecahedral) crystallization.

The powder of them is a dull, ashy, reddish brown. The powder of crystallized chromate of iron from our collections, which on the fracture exactly resembles these grains, is of a dull greenish black. Both powders preserve brilliant points in them, though rubbed to the utmost fineness.

In the forceps, in both flames: becomes somewhat dull but does not alter.

Fused with soda on charcoal, the powder gives only the traces of iron. When nitrate of potash is added to the bead on platinum wire a yellow greenish opaque bead is obtained.

With phosphate of soda and ammonia a green bead.

With borax on platinum wire a fine emerald green bead is obtained, with minute black grains, which seem infusible in it. When Nitrate of potash is added to the borax, the whole is fused to a clear dark bottle-green grass.

When the powder was fused in a platina crucible with borax, to which nitrate of potash was gradually added, it slowly fused to a very pale yellow mass, which was mostly soluble in water; a little silica only remaining, and when filtered it gave a pale green yellow solution from which chromate of lead was obtained by acetate of lead, but the precipitate by this process was at first of a lighter yellow than usual, and only assumed the usual bright yellow of chromate of lead on the filter. I am of opinion that these black grains are, like the residual ones noticed in my examination of Captain Sherwill's Meteoric Iron (Journ. Vol. XVII. Part X. p. 549), a siliceous sub-chromate.

The Crust.

I collected by the help of a magnifier a few fragments of the black crust from amongst the fragments and dust, but it was very difficult to find any so completely detached from the grey mass as to be purely crust; one or two so found appeared crystallized in minute brilliant facets or needles on the inner surface; and I am inclined to think that the greater part of the crust is really crystallized on its inner surface though outwardly it only appears rough and as if semi-fused.

Before the blowpipe.—Alone, infusible and unalterable.

With borax on platinum wire, a minute fragment fused partially but very slowly. The glass was coloured of a pale green.

When nitrate of potash is added to the bead of borax, it fuses quickly and entirely to a pale grass green.

A portion of the crust, in powder, fused in a crucible with nitrate of potash gave only a pure white mass, which, dissolved in water leaves a dull red sediment and this by solution in muriatic acid is found to be iron with a little silex. No traces of chromium could be detected in these minute assays, but it would doubtless be found where the black grains appear fused into the crust.

Analysis.

By a careful examination the complete absence of nickel, cobalt, and magnesia were established, and the results per cent. were as follows :—

Water, ...	0.	12.	
Arsenic, ...	trace.		
Sulphur, ...	0.	10.	
Iron peroxide, ...	26.	80.	protox 24.48.
Silica, ...	68.	60.	
Alumina, ...	0.	50.	
Oxide of Chrome, ...	2.	00.	
	98.	12.	
Loss, ...		88.	
	100.	00.	

The black grains are chromate or sub-chromate of iron, and hence a variable portion of the assay, depending on the quantity of these and probably of that of the darker portion of the Aerolite, will be always in the state of chromate of iron ; and the excessive friability of the mass is explained by the absence of alumina and the earthy state of the silica.

Reviewing this paper : Every lover of science will join with me in repeating our obligations to Mr. Mactier for his active zeal in procuring for us this valuable specimen, and in regretting deeply that we have been unable to secure the entire stone, or at all events a good sectional fragment of it, by which we might have obtained some better insight into its state of aggregation at the centre, and hence have ascertained if it had any nucleus ; and I cannot close without earnestly impressing

on the minds of all who may read it, the great service which they cannot fail to render to the cause of science by securing immediately, and guarding with the utmost care, every stone, known or reputed to be a meteoric one, so soon as information of it reaches them, if by any means this can be done; and it would seem that a formal notice to the nearest Thannah that such stones were the property of Government would not fail to insure due care being taken of them? I need hardly explain that these (fragments of other worlds?) are perhaps not remotely connected with great questions of Astronomy and Cosmology, and that the labour of those who bring the materials to men like Herschell, Humboldt, Strüve and so many more, humble as it seems, is yet important and indispensable, and has its share of honor from every right-thinking mind.

APPENDIX.

I have thought it worth while reprinting at full length the queries sent by me to Mr. Mactier, to assist in obtaining for us good information on any future occasion. I have no doubt that many stones fall in India of which we never hear, but no opportunity should be lost of securing all we can obtain, both in the way of information and specimens.

Queries to which it is desirable replies should be obtained from all persons near the spot where Meteorites fall—from separate witnesses, and as facts within *their own* knowledge; not by hearsay.

Name and profession of deponent.

2. Where was he when it fell and at what time did it fall?

3. Where did it fall? describe the spot exactly.

4. What kind of ground did it fall upon (send a good specimen of the soil) and describe it particularly as to rocks or stones, or alluvial or arable land?

5. How far from any water?

6. How many pieces?

7. What became of the other pieces? (If any small ones can be found near the spot like it, or with a black crust, send them).

8. How was the sky when it fell?

9. What noise did it make?

10. Was there any blaze of light with it, or any wind blowing at the time?

11. When did you first see it?

12. Was it hot or cold then?

13. Did it seem to have burned any thing? or to have *dried up* the ground where it fell?

14. Was the stone or the ground smoking when you first saw it?

15. Was there any smell about it?

16. How was it lying when you first saw it? i. e. lying flat? or sticking up? If sticking up in the ground shew how, viz. if upright or at what angle nearly?*

17. When dug out, was there any sign of burning or baking of the earth at the lower part? if so send some of that earth; 3 or 4 seers at least.

18. Did it get warm, or hot, *after* it fell?

19. Did any change of its colour take place? and of what colour was it in a clear daylight when you first saw it?

20. What kind of weather was there the day and night previous to the fall of the stone?

21. Did you ever hear of any stones of the kind having fallen before.

22. Was any wind blowing; and from where?

Memorandum. It will be advisable to let each deponent tell his own story separately in the form of a narrative, and then cross question from these queries adding any other particulars. If sent in Benghlee or Hindustanee also, they will be welcome to us. The references to the queries and their replies should be distinguished by their numbers, and the more witnesses and information the better.—H. Piddington.

Translation of Vichitra Nátak.—By Captain Siddons, *1st Cavalry.*

Chapter III.

God pleased to promote anger and strife
The best of men could not stand neutral,
Lust and avarice were so potent

* Witness should shew this which is very important by sticking a stone or brick or log into the ground.

Mighty heroes could not avoid them.
By these excited, madly they fought,
And using their weapons in fierce strife
They maimed and slaughter'd each other;
The devil rejoicing drumm'd merrily.
Sheo* wore his necklace of human skulls,
Imps rejoiced, and demons urged to war;
Vultures and hyænas prowled about,
And dead bodies thickly strewed the ground.
Oh! there was hacking and many wounds,
Hands grappling arms, beards with fury pulled!
Heads broken, sinewy arms lopped off,
And many chettries† pierced with arrows.
Wild beasts skulked on every side;
Animals of every kind were glad.
And ogres mixed with the happy groups;
'Cause there were carcases enough to eat.

The shouts of heroes equalled the thunder;
They planted their flags in deadly hatred;
Full of anger, they fought with sword and spear.
Foot to foot on the ground, these heroes fought.
The swords of the brave clashed fearfully;
Their iron weapons dealt destruction.

Battle axes, spikes, and double-edged swords,
Short swords and daggers, and forsooth weapons
Of every kind and shape, were flashing
Around, about, and simultaneously.
By wrath excited, the men were reckless,
And fearlessly they wielded their weapons.
Mad with deadly hatred, they heeded nothing,
But, hurling defiance, they cut and slash'd about them.

Thousands of fairies came from heav'n to see
The combat, vociferating "Fight—Fight!"
Some men lost limbs, many bandaged their wounds,

* *Sheo*—Siva. † *Chettries*—men of the second or military caste.

The flesh of others was hack'd to pieces,
And warriors strewed the red ground in heaps.
There was a clamour of shields, of loud drums,
Mix'd with groans, as these heroes contended.
Now they pause, but only to bend their bows
And shoot their arrows. Then again with swords
To wound,—wounds which are, nor felt, nor cared for.
Phrenzied with rage, lo! neither party flies,
The din of battle, mocks heaven's thunder.
They dare each other to single combat,
And gladly yield their souls to paradise.
Their angry blades flash sparks like lightning.
Shouts rend the air. Death, death, the only cry!
They roll on the ground in deadly struggle
And hurl defiance, even as they die.
Blood flowed in streams, and fairies hover'd near.
Káli applauded, evil imps rejoiced,
And manly shouts, shamed the loud thunder.
The armies engaged with a violence,
And roar, like as the sound when oceans meet.
Fiery coursers plough the soil. Dripping
With red blood, Devi, who knoweth all things,
Gave encouragement, and fierce beasts who live
On bodies, howled with joy; elephants and
Horses cumber'd the earth, their carcases
Mix'd in sad confusion with their riders!
Both sides claimed victory. If either were forced
Back, it rallied, and fought more fiercely still.
Blow after blow was dealt, quick as lightning;
And the arm of hatred was as active
As larvæ in the water!

The warriors were inflamed as warriors never were before, and the inspiriting kettle-drums roused them to deeds of daring and boldness. Cut to pieces and pierced with arrows, they still fought on. The youthful and the veteran alike fell in this great battle. And many reeled and staggered as if they were drunk with blood. Sounds of warlike instruments, mingled with the shouts of war. And clouds of

arrows obscured the golden sun ; the sight was awe inspiring, and the battle terrible as that which was fought between Indra and Britrásúr ; the field of contest was crimsoned as though the Hooly had been celebrated on it.

Those who remain'd to fight, were all slaughter'd ;
Who fled, for ever mourned their cowardice.
Awful confusion prevailed everywhere,
Armour and swords were scatter'd all about ;
Heads with distorted faces, clotted beards
And gory trunks, mix'd with dying horses.

Kál spared not one of these mighty warriors who contended so fiercely in this terrible battle, all perished ; but their sins were forgiven them ; they were hewn in pieces and died the death of brave men. Earth recorded their fame, and their souls found rest and immortality in Paradise.

This was indeed a terrible battle, and mighty were the heroes who fought in it, and are now in the ranks of the blessed. But I must not add more in their praise, for to do so would be like extolling my own excellence, since I am of them, and from them. Enough! the followers of Lav were victorious, and the army of Kúsh was defeated, the small remnant of the latter who escaped, fled to Káshi and studied the Véds. They remained there many years.

This concludes the 3rd Chapter, describing the great battle between Lav and Kúsh.

Chapter IV.

Those who adopted the Véds were called Védis
And walk'd in the paths of religion with zeal,
The king of the Punjáb sent messengers greeting,
And begged them to return to friendship and love.
The Rájá's messengers arrived at Benares
And straightway told all that their master bid them say ;
On which, the Védis went to Rájá Madnedésh
And bowing low, they humbly made obeisance.
In open court, surrounded by his great chieftains
And proud nobles, the Rájá had the Veds read to him.
He listened with great piety ; the Sám, Yajus
And Righa Véds, were fully explained to him.

And when his mind had comprehended well, the fourth,
Or Atharv Véd, his sins instantly forsook him.
Full of religion, he gave up his kingdom
To the Védis, and sought the shelter of the woods.
There to reflect, and make atonement for his crimes,
His people all went with him, and remain'd content
That he, their king, had giv'n up all for God.
The Védis rejoiced to get the kingdom,
And most diffusely scattered their alms ;
They promised, in the iron age to come
As Nának, and take the king to heaven.
The race of Lav dwelt in solitude and
The Védis enjoyed their possessions.

Oh king ! just as thou listenedst to three Véds in silence, but on hearing the fourth, gave up thy soul to penitence, and thy kingdom to us, so we shall pass through three stages of existence, and at our fourth coming, thou shalt be made a Gúrú.

The Rájá comforted with this assurance, arose and went to the forests, and the Védis were happy in the possession of their new kingdom. To what length shall I extend my narrative ? I fear my volume will be a bulky one !

This concludes the 4th Chapter which tells of the king of Lav and the Holy Véds.

Chapter V.

In the course of time, however, the Védis were subjected to feuds and animosities, which the wisest among them were unable to quell or avert, and after many struggles, their race became almost extinct, for Bráhmaṇs demeaning themselves, became almost as Súdras, Kshétris resembled Baishyas, whilst Baishyas were as Kshetris, and Súdras were exalted to Bráhmaṇs.

The Védis retained some twenty villages, the remnant of their large possessions, and became cultivators of the soil ; they continued to be farmers for a long time, until at length Nának appeared on earth.

Nának did not long remain with this remnant of his tribe, he wandered among the Sikhs, and imparted comfort to them and religious consolation.

In this iron age, he taught his doctrines
And pointed out the true religion.
Such as listen to his precepts and walk
In his ways are free from sin, and happy,
God put away the sins and cheered the hearts
Of all those who became his disciples ;
They suffered neither sorrow, nor hunger.
*Nor were entrapped within the net of time.
Nának afterwards appeared as Angad,
And lived religiously in the world ;
Then, as one lamp receives its shining light
From other lamp, he came as Amar-dás ;
Then as Rám-dás, when, having quite fulfilled
†His promise to the Rájá, he went to heaven.
These four were emanations of one spirit
Which *fools* repudiate, but wisdom understands.
Many believ'd they were distinct persons,
Only a few acknowledg'd them as *one*.
These latter reaped the reward of good faith,
And unbelievers lost by their folly.
Rám-dás was absorbed in omnipotence,
But the spirit of this Gúrú once more
Descended, and took the form of Arjún.
When Arjún sought the realms of happiness
Lo ! he was succeeded by Hargovind,
And after Hargovind, there came Himrái ;
Har-kishn then, then follow'd Tegh Bahádúr
Whose sacred cord the God of gods revered ;
His fame was glorious in this iron age,
For all his words were wise, his actions good ;
‡He gave his life, a Martyr to his faith !
True to his creed, unflinching, lo ! he died.

* Which signifies "They obtained their pardon."

† Vide 4th Chapter.

‡ The great but bigoted Emperor Aurungzéb seized the reformer Tegh Bahádúr, and having in vain endeavoured to make him forswear his religion, put him to death by skinning him alive, after which he was decapitated and his head exhibited publicly.

His head they took, but could not turn his heart;
And thus it is, apostates are abhorred
By living man, and scorned by the undying God.
His death brought shame on the Muhammedan,
Though his soul went to everlasting bliss.
Dear is thy memory, Tegh Bahádúr!
Earth mourn'd its separation from thee,
And heaven welcomed thee with shouts of joy.

(*To be continued.*)

Note.—The reader is requested to make the following corrections in the first two chapters of the Vichittra Nátak published in the last volume of the Journal.

In page	521	line	26	for "second"	read *sword.*
,,	—	,,	27	for "Even"	read *ever.*
,,	522	,,	8	for "playing"	read *blazing.*
,,	—	,,	18	for "desirest"	read *deriest.*
,,	524	,,	8	for "at"	read *as.*
,,	531	,,	21	for "bad"	read *had.*
,,	532	,,	2	for "Kapur"	read *Kasiur.*
,,	—	,,	15	for "Sauand"	read *Sanoud.*
,,	—	,,	27	for "houses"	read *horses.*

On the adaptation of the ANEROID *for the purposes of surveying in India.*—*By* G. BUIST, LL. D., F. R. S., L. & C., F. G. S. *&c.*

One of the greatest desiderata with travellers, is to be able to obtain an instrument for measuring elevations, of moderate size, considerable portability and immunity from injuries from the accidents apt to be encountered in journeying through new countries; a great degree of nicety or exactitude is rarely attainable on a first visit, and is willingly dispensed with in comparison to tolerable approximations when only attainable at the expense of much outlay, trouble and loss of time. The mountain barometer can be made tolerably portable so far as size and weight are concerned, but is in its strongest and most efficient form so extremely liable to accidents, so expensive, and so difficult in India to get repaired or replaced that few travellers in the East care to be encumbered with it at all. The Mountain Thermometer has done excellent barometric service in India; but it has seldom happened that instruments, cut finer than fifths of a degree, have been made use of—at moderate altitudes one degree corresponds with five hundred feet of elevation, so that even when degrees are cut to tenths, the smallest division will not indicate less than fifty feet. A good barometer read-

ing to thousands will indicate ten feet. The Mountain Sympiesometer scarcely seems to have been made use of at all amongst us; wherefore I know not: the instrument is quite as portable as the Aneroid: it is much less susceptible of injury than the Mountain Thermometer, but is apt on being long used in this country to change its rating. Both the Aneroid and Sympiesometer in their best forms require to be verified by frequent reference to a standard barometer. The Mountain Thermometer has this advantage over both that once rated it runs little risk of going sensibly wrong. I say sensibly, for by a late paper of Mr. John Adie's it appears that even Thermometers in the course of time alter their indications.* The Mountain Thermometer, portable as it is, is far from being exempt from accidents, and besides being apt to be broken in carrying about or in heedless handling while being boiled, the air is liable to get entangled with the mercury, an accident often occurring to such an extent as to occasion the risk or destruction of the instrument.†

* Mr. John Adie of Edinburgh has published a very elaborate article in the Edinburgh Philosophical Journal of January, 1850, on the change which takes place in the starting points of Thermometers, often amounting to no less than nine-tenths of a degree in a few months; this is equal to 450 feet in elevation, supposing the thermometer to be cut to tenths, there being no means of detecting or remedying the error. I do not think any Aneroid or Sympiesometer likely under any circumstances to go wrong to the extent of half an inch, nearly the equivalent of this, if they have been tolerably taken care of from the time of their last rating by the standard Barometer or reference to some point of known elevation.

† The following description is given by Mr. Adie, of the Mountain Thermometer as supplied by him to the Bombay Geographical Society. "The Thermometers for the determination of altitudes by the boiling point of water are constructed as follows: A piece of tube is selected of perfectly equal calibre throughout its length; the section of the bore is round and fine, for the purpose of giving long degrees without having a very large bulb, which renders the carriage of such Thermometers, very dangerous for breakage; the bulb is made of glass cylinder tube, which can be made more equal and stronger than a round bulb: and the proper size having been determined for each tube, the scales are determined by the following process: each tube with its finished bulb is weighed by a fine balance to 1.100th of a grain: they are then fitted with pure dry mercury and regulated so that 62° shall have the same position as 212° is to have when the Thermometer is finished.

Temporary scales, divided into inch and decimal parts, are then fixed to each tube, and the point 32° obtained from melting ice, and 62° from a fine standard Thermometer, and carefully read off on these temporary scales. This gives the

Under all these circumstances were the improvements of which the Aneroid is susceptible carried into effect, it is, taking it altogether, one of the most convenient instruments of which the traveller can make use within the limits to which it is trustworthy, whatever these may be. The following description of the Aneroid taken from Dr. Purdie (Thompson's Manual) will make what is about to be stated more clear than it otherwise might have been.

length of 30° at these temperatures. But it is evident that this length would be greater than 30° if we drive out a portion of the mercury, to make 212° stand at the point where 62° stood when the scales were measured. This is corrected by carefully weighing the tubes before and after regulating them for 212°, and the proportion is stated: if the larger quantity of mercury give the length noted, the diminished quantity of mercury from regulation to 212° will give a diminished scale, which scale is the true or corrected one, to be divided on the thermometer; each degree is subdivided into fifth or tenth parts and cut on the glass stem of the thermometer; or may be laid down on an attached scale.

When the thermometer is to be used, the bulb must be carefully inspected to see that there are no small detached globules of air attached to the interior of the bulb: should such be found they are to be removed by shaking in a larger globule from the contracted part of the bulb, and making it pass over the smaller globules, which it will take with it; it is then to be returned to the contracted part; and should any small portion of the mercury lodge in the tube, it is to be joined to the column by heating the bulb till it rise to the small bulb at the top of the thermometer, where the detached portions will unite.

The best *method of using* these Thermometers is to have the bulb and column of mercury up to the reading point brought to the boiling temperature: this is best done by a boiler provided with telescope slide-tubes, which can be regulated to any required length; or where such an apparatus is not at hand, the same length of column, as nearly as possible, should be kept out of the water. Professor J. D. Forbes (Philosophical Transactions, Edinburgh, Vol. XV, page 409) has with great care determined the difference of altitude due to a change of 1° in the boiling point of water, and found it to be 549. 5° for each degree of Fahrenheit. Thermometers used for this purpose should be frequently compared one with another, and their differences noted; or where one only is used, the instrument should be noted as frequently as possible, both for the purpose of obtaining more perfect results from a mean of the observations, and for correcting small changes in the indication which go on in course of time.

For security in carriage, the Thermometer is enclosed in a brass case and supported at all points by woollen stuffing, and is removed from its case by screwing off the top and bottom, and pushing out the bulb when the Thermometer may be drawn out."

*Aneroid Barometer.** "Since writing the preceding paragraph, the author has inspected† this new and beautiful instrument, invented by M. Vidi. It was described by Professor Lloyd to the British Association,‡ and reported to have stood the test of being placed under the receiver of an air-pump, when the indications corresponded with those of the mercurial gauge to less than 0.01 inch. The principle upon which the instrument depends, is the pressure of the atmosphere upon a metallic chamber partially exhausted, and so constructed, that by a system of levers a motion is given to an index-hand which moves upon a dial.

"The principle of the vacuum-case was formerly applied by M. Conte § in Egypt, but from the faulty mode of constructing his instrument, it was rejected and neglected.

"Upon comparison of indications made with the Aneroid Barometer —not corrected for the particular temperature—and a very perfect mercurial barometer, given by Mr. Dent, we find that from forty-nine observations made between the 6th January and 23rd February, 1848, the mean difference was 0.037 inch, the *aneroid* being in excess: and from sixty similar observations made with a standard barometer, during December, 1848, and between the 3rd and 31st January, 1849, the mean difference amounted to 0.026 inch, the *mercurial* being, in this case, in excess over the aneroid barometer. Combining these observations (109 in number) a mean difference amounting to 0.0025 inch is found to exist, the indications of the aneroid being in excess. ‖ For general use, the instrument is thus shewn to be well suited; for the measurement of heights it is peculiarly adapted, from its portability and comparative strength; and for nautical purposes we know of no better instrument.

* *a* privative, *νηρός* and *εἶδος*—a form without moisture. See Dent on the Aneroid Barometer; Mech. Mag. No. 1307.

† At Mr. Abraham's, Lord Street, Liverpool. The price is £3. It is 4¾ inches in diameter, and 1¾ inches thick. The scale is divided to 0.025 inch.

‡ At Swansea, in 1848.

§ Bulletin des Sciences. Floreal, An. 6, p. 106.

‖ The sum of all these observations gave 3239. 712 inches for the aneroid, and 3239.44 inches for the mercurial barometer, the difference being 0.272 inch, which divided by 109, = 0.00249.

"Fig. 1. represents the external appearance of the Aneroid Barometer: Fig. 2. its internal arrangement, where the dial is supposed to be removed and the index-hand retained; and Fig. 3. a perspective view of the same.*

"In Fig. 2. *a* is the metallic chamber or vacuum-vase, which receives

Fig 1

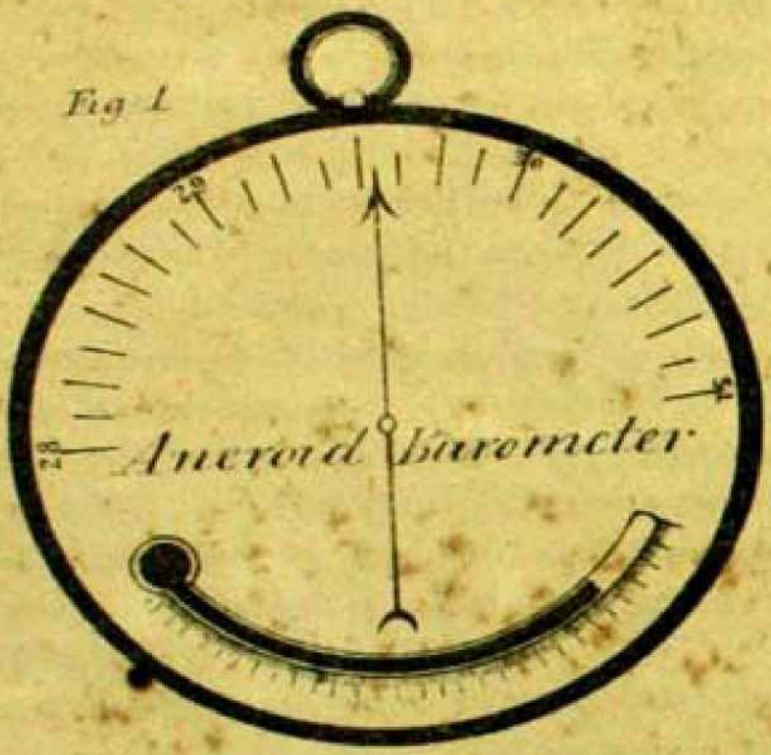
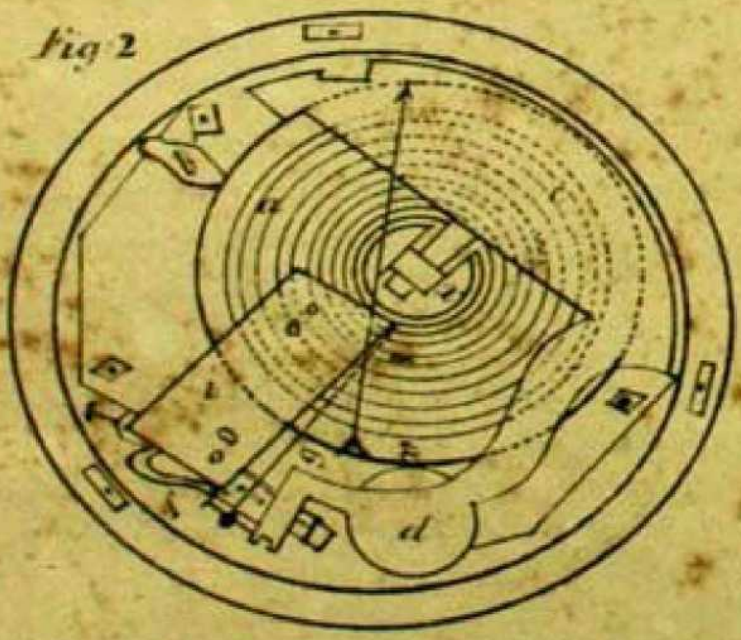


Fig 2

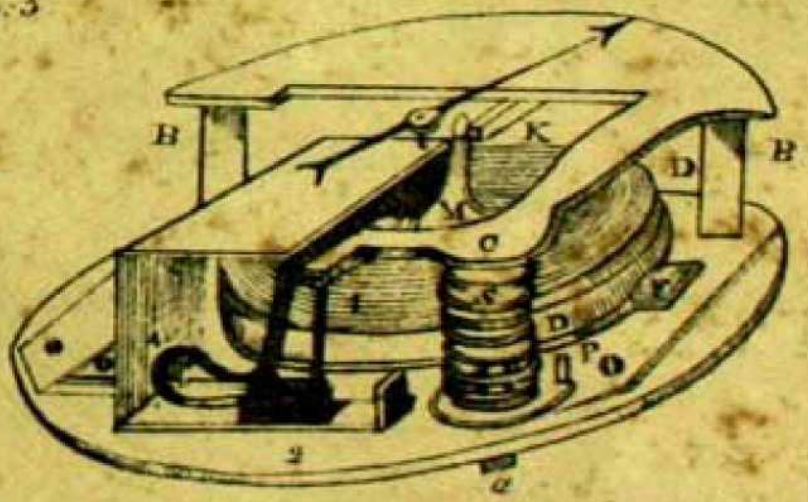


* We beg to acknowledge the kindness of Mr. Dent, in permitting casts to be taken of Figs. 3, 4, and 5,—Aneroid Barometer.

the atmospheric impressions; it is corrugated in concentric circles, which increases its elasticity, and renders it more susceptible of atmospheric impressions; *b* is the tube, hermetically sealed, through which the air in *a* is exhausted. At the centre of *a* there is a solid cylindrical projection *x*, to the top of which the chief lever *c d e* is attached —this lever, which is of the second order, rests upon 2 fixed pins, or fulcra, placed vertically, and upon a spiral spring under *d*, but it is perfectly mobile. The extremity *e* of this lever is attached by a vertical rod and bow-shaped spring *f*, with another lever to which a watch-chain *g* is fastened and extended to *h*, where it works upon a drum fixed to the axis of the index-hand, connected with a delicate spring at *h*,—the vertical motion is thus changed to a horizontal one, and the hand, which is attached to the metallic plate *i*, is thereby moved upon the dial. The movement originating in the vacuum-chamber is multiplied by these levers, so that a change in the corrugated surfaces, amounting to 1-220th of an inch, carries the point of the index-hand through a space of three inches on the dial.

"In Fig. 3. the vacuum-chamber is represented by D; the large lever by C, resting upon the fulcra B B and spiral spring S, and supporting the box D by the pin K. At the extremity of C is seen the vertical rod (1) connecting it with the levers (2 and 3) by the bow-

Fig. 3



shaped spring (4). The square-headed screws *b c*, by screwing or

unscrewing, admit an alteration in the distance of leverage, and thereby enable the index-hand to move over a space corresponding with the scale of a mercurial barometer. To the lever (3) is attached a light rod terminating with the watch-chain, which is attached to the drum fastened to the axis. The handle is kept firmly fixed, when not in motion, by a delicate flat spiral spring attached to the axis, acting against the force of the levers, and always in a state of tension. F is the exhausting tube; and A, at the back of the instrument, is a screw, which upon being turned, alters the position of the index-hand, and thus enables the observer to adjust the aneroid to any mercurial barometer. The atmospheric pressure increasing on D, will cause a slight depression of the corrugated surface to which K is attached, and a corresponding inclination of the lever C; but as this lever is resting upon unmoveable fulcra at BB, the motion will take place chiefly over the spiral spring S, the increased distance of the lever being as six to one. The metallic chamber being 25 inches in diameter, the pressure of the atmosphere should be about 73 lbs. upon the corrugated diaphragms, but owing to various causes it is not more than 44 pounds.

"Figs. 4. and 5. represent the vacuum-case, separated from the levers. The former shows the case before exhaustion; the latter after the air has been withdrawn. *a a a a* indicate the lapping over of the thin corrugated metallic diaphragms, where they are soldered to the rim;

Fig. 4

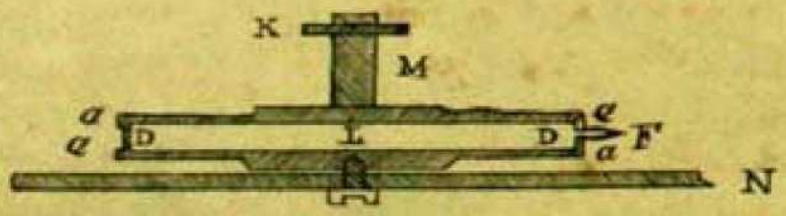
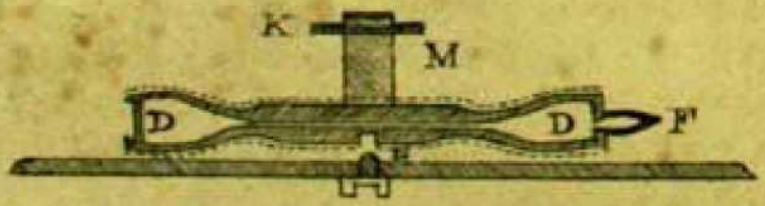


Fig. 5.



D is the vacuum chamber, with F the exhausting tube; and L the screw part fixing D to the metallic plate N below. In Fig. 5, the vacuum-case is in a state of compression after being exhausted, and M represents the socket, which being pulled by the pin K, places D in a

state of tension. The dotted line marks the position of the diaphragms after the introduction of the gas, which effects compensation for changes in the capacity of the case by alterations of temperature. Without this gas the capacity of the case would be diminished by heat, and increased by cold, but the changes in the elasticity of the gaseous fluid by varying temperatures, effect compensation. In using the Aneroid Barometer for scientific purposes, a certain thermometrical correction is required. This is made by carefully noticing the indication of the instrument in the external atmosphere, then placing it before a fire till the thermometer indicates 100° F., and watching the change which has taken place. The variation of the hand, divided by the degrees of the thermometer, gives the quantity for each degree. The amount will be sometimes in excess, occasionally in defect."—*Dr. D. P. Thomson's Introduction to Meteorology*, pp. 447—452.

The following are the readings of various comparisons taken by the Aneroid and Barometer made at different elevations up to 2000 feet above the level of the sea. Further than this I have not gone.

The survey station at Neat's Tongue, between Trombay and Mehal, exactly 1000.6 feet above the mean level of the sea, as ascertained by theodolite, afforded a very suitable place for experiment; and the collection of instruments in possession of the Geographical Society offered a most convenient opportunity for determining the point. The beautiful standard barometers by Adie, 2, 3, and 5 were with three Aneroids now selected for comparison. Barometer No. 4, was left at Balcairn, about seventy feet above the level of the sea, and No. 1 in the Geographical Society's Rooms, thirty-five feet lower, for reference. The first observation was made at 5 P. M., about half way up the hill, where barometer No. 4, stood at 29,600, temperature 84°; at Balcairn it had stood at 29,874 at 3 P. M., temperature 86° : it had thus fallen 00.274. The three Aneroids stood as follows—

	No. 3187	No. 1942	No. 1737
Aneroid, 70 feet above sea, ...	29.945	29.860	29.850
Neat's Tongue,.....	29.626	29.552	29.560
Difference	319	308	290

Mean. 306. There was no time to try more than one barometer here. On the top of the hill three barometers were made use of

exactly at the survey station, the cisterns were six inches above ground. The following is the result.

	No. 2	No. 3	No. 5
Barometers at Balcairn at 3 P. M.	29.882	29.849	29.874
Barometers at Survey Station at 6 P. M...	28.966	28.986	28.984
Difference	.916	.863	.890

Mean .889. The temperature at Balcairn was 5° higher than that above: no correction for this was at this stage made.

Aneroids as above, ...	29.945	29.860	29.850
	28.900	28.888	28.950
Difference	1.045	.972	.900

Mean .972. Difference from barometric mean .083

The following experiments were made at the level of the sea at half tide, and at Balcairn, on the summit of the rock close by;

	No. 2	No. 3	No. 5
Barometer, lower	29.936	29.914	29.926
Barometer, upper	.860	.836	.856
Difference	.076	.078	.070
Aneroid, lower	29.910	29.830	20.923
Aneroid, upper	.840	.770	.850
Difference	.070	.060	.073

The mean depression of the aneroids was thus .067, that of the barometers was .074—difference .007—seven thousandth parts of an inch. When the difference of level between two places is trifling, one tenth of an inch of depression represents 100 feet, so that Balcairn by this is about seventy feet above the level of the sea. Leisure was not allowed to make any of these observations with the care required: the barometer when carried about in the sun ought always to be allowed to hang in the shade for a sufficient length of time to permit the mercury in the cistern and tube to obtain the same temperature as that in the attached thermometer, forbidden by Sir J. Herschell to be immersed

in the cistern. Had due precautions been used, the results, would most likely have been all in favor of the aneroid.

The following were then tried at Parell Hill—first at the point where the road from the gardens crosses; then in the turret at the base of the flagstaff. Barometer No. 4, which was left below stood at 29.960 at a quarter to seven: the observations were all made betwixt this and half-past seven.

	No. 2	No. 3	No. 5
Barometer, lower	29.940	29.920	29.916
Barometer, higher	.840	.828	.830
Difference	.100	.092	.086

giving a difference of elevation of about 90 feet. The aneroids stood as follows, the instruments being arranged in the same way as before;

Road Station, ...	29.885	29.850	29.910
Flagstaff, ...	.815	.740	.815
Difference	.070	.110	.095

giving a mean of .092 nearly: a singularly close coincidence indeed, the barometers in both cases having got heated in the sun, and no time to allow the mercury to cool to the temperature of the attached thermometer. The following ratings made at the observatory betwixt the great standard and an aneroid are for two motives still more satisfactory as being more full from May till December; the discrepancies are so great that they can only be explained on the assumption of the instrument having got out of order. We have taken no account of the difference betwixt the instruments, as they may be so adjusted as to work together, the daily range being the great test of delicacy.

Comparison betwixt the Standard and Aneroïd Barometers made at the Observatory, Colaba, betwixt January and December, 1850, *with the range of each, showing the remarkable diminution of the Aneroid in the Course of the Year.*

Month.	Barometer.		Range.	Aneroid.		Range.
	Max.	Min.		Max.	Min.	
January, 1850.						
7th, ...	29.980	29.839	.141	29.90	29.80	.10
8th, ...	.922	.780	.142	.85	.72	.13
9th, ...	.856	.720	.136	.81	.69	.12
10th, ...	.861	.742	.119	.80	.70	.10
11th, ...	.929	.798	.131	.88	.70	.18
12th, ...	.908	.800	.108	.93	.71	.22
13th, ...	..	.791	..	..	.70	..
14th, ...	.875	.755	.120	.78	.66	.12
15th, ...	.910	.790	.120	.80	.69	.11
16th, ...	.931	.798	.133	.85	.71	.14
17th, ...	.919	.795	.124	.82	.72	.10
18th, ...	.914	.805	.109	.82	.74	.08
19th, ...	.930	.797	.133	.83	.74	.09
20th, ...	..	.896	..	..	.80	..
21st, ...	.980	.842	.138	.88	.75	.13
22nd, ...	.941	.833	.108	.84	.75	.09
23rd, ...	.930	.810	.120	.81	.71	.10
24th, ...	.929	..	..	.81	.70	.11
25th, ...	.960	.833	.127	.81	.72	.09
26th, ...	.957	.833	.124	.87	.75	.12
27th, ...	..	.844	..	..	.75	..
28th, ...	.953	.844	.109	.87	.75	.12
29th, ...	30.003	.844	.159	.85	.80	.05
30th, ...	.015	.892	.123	.90	.80	.10
31st, ...	29.994	.880	.114	.90	.80	.10

Month.	Barometer.		Range	Aneroid.		Range.
	Max.	Min.		Max.	Min.	
February,						
1st, ...	29.981	29.865	.126	29.88	29.80	.08
2nd, ...	30.017	.850	.167	.97	.80	.17
3rd, ...	..	.948	..	..	.89	..
4th, ...	.059	.927	.132	30.00	.89	.11
5th, ...	.050	.928	.122	.00	.88	.12
6th, ...	.026	.876	.150	29.99	.85	.14
7th, ...	.027	.882	.145	30.00	.89	.11
8th, ...	.019	.908	.111	.00	.89	.11
9th, ...	.053	.901	.152	.01	.88	.13
10th, ...	..	.902	..	..	.90	..
11th, ...	29.981	.884	.097	29.96	.87	.09
12th, ...	30.015	.856	.159	.99	.86	.13
13th, ...	.013	.883	.130	.98	.85	.13
14th, ...	.002	.880	.122	.99	.83	.16
15th, ...	29.999	.852	.147	.96	.82	.14
16th, ...	.994	.844	.150	.94	.80	.14
17th, ...	..	.863	..	..	.83	..
18th, ...	.976	.847	.129	30.00	.83	.17
19th, ...	.997	.875	.122	29.95	.93	.02
20th, ...	30.024	.905	.119	30.08	.98	.10
21st, ...	29.997	.835	.162	.04	.90	.14
22nd, ...	.936	.733	.143	.00	.88	.12
23rd, ...	.986	.832	.154	.01	.93	.08
24th, ...	.971	.855	.116	.02	.93	.09
25th, ...	..	.854	..	..	.98	..
26th, ...	.970	.847	.123	.02	.93	.09
27th, ...	.986	.837	.149	.04	.95	.09
28th, ...	.965	.830	.135	.01	.92	.09
March,						
1st, ...	.980	.829	.151	.03	.92	.11
2nd, ...	.985	.821	.164	.04	.90	.14
3rd, ...	..	.844	..	..	.91	..
4th, ...	.954	.823	.131	.01	.90	.11
5th, ...	.952	.820	.132	29.91	.80	.11
6th, ...	.927	.800	.127	.90	.79	.11
7th, ...	.988	.850	.138	.95	.81	.14
8th, ...	.962	.818	.144	.92	.80	.12
9th, ...	.972	.794	.178	.94	.78	.16
10th, ...	..	.873	..	..	.85	..

Month.	Barometer.		Range.	Aneroid.		Range.
	Max.	Min.		Max.	Min.	
March,						
11th, ...	29.895	29.864	.031	29.95	29.84	.11
12th, ...	.979	.864	.115	.95	.84	.11
13th, ...	.925	.805	.120	.90	.79	.11
14th, ...	.925	.810	.115	.90	.80	.10
15th, ...	.948	.832	.116	.91	.80	.11
16th, ...	.936	.822	.114	.91	.81	.10
17th, ...	..	.873	..	..	.86	..
18th, ...	.971	.828	.143	.94	.81	.13
19th, ...	.978	.844	.134	.94	.84	.10
20th, ...	.942	.794	.148	.91	.80	.11
21st, ...	.922	.808	.114	.90	.80	.10
22nd, ...	.941	.812	.129	.92	.80	.12
23rd, ...	.991	.849	.142	.98	.85	.13
24th, ...	..	.907	..	..	.90	..
25th, ...	30.029	.882	.147	30.01	.90	.11
26th, ...	29.973	.846	.127	29.98	.85	.13
27th, ...	.947	.844	.103	.95	.86	.09
28th, ...	.978	.836	.142	.98	.85	.13
29th, ...	.966	.816	.150	.95	.84	.11
30th, ...	.918	.765	.153	.97	.81	.16
31st, ...	..	.793	..	..	.92	..
April,						
1st, ...	.886	.783	.103	.92	.83	.09
2nd, ...	.907	.818	.089	.97	.89	.08
3rd, ...	.933	.816	.117	.98	.89	.09
4th, ...	.947	.787	.160	30.00	.84	.16
5th, ...	.896	.782	.114	29.95	.84	.11
6th, ...	.926	.755	.171	.98	.80	.18
7th, ...	..	.782	..	..	.84	..
8th, ...	.857	.756	.101	.91	.81	.10
9th, ...	.826	.707	.119	.87	.74	.13
10th, ...	.859	.728	.131	.88	.80	.08
11th, ...	.884	.740	.144	.90	.79	.11
12th, ...	.859	.728	.131	.88	.76	.12
13th, ...	.867	.752	.115	.90	.81	.09
14th, ...	..	.773	..	..	.80	..
15th, ...	.861	.773	.088	.94	.80	.14
16th, ...	.904	.779	.125	30.01	.90	.11
17th, ...	.894	.780	.114	.01	.91	.10

Month.	Barometer.		Range.	Aneroid.		Range.
	Max.	Min.		Max.	Min.	
April,						
18th, ...	29.883	29.783	.100	30.00	29.91	.09
19th, ...	.903	.795	.108	.02	.92	.10
20th, ...	.895	.777	.118	.01	.91	.10
21st, ...	..	.831	..	.	.88	..
22nd, ...	.928	.800	.128	.07	.94	.13
23rd, ...	.942	.768	.174	.08	.91	.17
24th, ...	.907	.736	.171	.06	.90	.16
25th, ...	.828	.688	.140	29.98	.85	.13
26th, ...	.827	.679	.148	.98	.84	.14
27th, ...	.820	.707	.113	.97	.89	.08
28th, ...	..	.722	..	..	.90	..
29th, ...	.849	.725	.124	.95	.85	.10
30th, ...	.852	.741	.111	.97	.85	.12
May,						
1st, ...	.866	.768	.098	.98	.88	.10
2nd, ...	.879	.730	.149	.98	.85	.13
3rd, ...	.826	.700	.126	.92	.82	.10
4th, ...	.817	.712	.105	.90	.82	.08
5th, ...	..	.708	..	..	.82	..
6th, ...	.840	.708	.132	.90	.82	.08
7th, ...	.832	.734	.098	.92	.87	.05
8th, ...	.890	.767	.123	.98	.87	.11
9th, ...	.852	.713	.139	.92	.80	.12
10th, ...	.853	.730	.123	.92	.85	.07
11th, ...	.821	.686	.135	.90	.75	.15
12th, ...	..	.747	..	..	.82	..
13th, ...	.814	.672	.142	.89	.81	.08
14th, ...	.794	.667	.127	.88	.77	.11
15th, ...	.814	.677	.137	.89	.78	.11
16th, ...	.807	.702	.105	.90	.80	.10
17th, ...	.833	.728	.105	.94	.81	.13
18th, ...	.853	.740	.113	.92	.81	.11
19th, ...	..	.784	..	..	.88	.
20th, ...	.890	.752	.138	.96	.87	.09
21st, ...	.852	.715	.137	.92	.83	.10
22nd, ...	.822	.706	.116	.90	.80	.10
23rd, ...	.820	.691	.129	.90	.80	.10
24th, ...	.816	.669	.147	.90	.78	.12
25th, ...	.798	.654	.144	.88	.74	.14

Month.	Barometer.		Range.	Aneroid.		Range.
	Max.	Min.		Max.	Min.	
May,						
26th, ...	29.783	29.659	.124	29.87	29.78	.09
27th, ...	.758	.678	.080	.85	.78	.07
28th, ...	.764	.673	.091	.85	.79	.06
29th, ...	..	.642	..	..	.72	..
30th, ...	.771	.669	.102	.88	.77	.11
31st, ...	.807	.692	.115	.90	.80	.10
June,						
1st, ...	.813	.650	.163	.90	.83	.07
2nd, ...	..	.682	..	..	.82	..
3rd, ...	.755	.650	.105	.84	.80	.04
4th, ...	.746	.649	.097	.84	.78	.06
5th, ...	.710	.610	.100	.83	.76	.07
6th, ...	.670	.560	.110	.80	.70	.10
7th, ...	.681	.582	.099	.81	.71	.10
8th, ...	.606	.586	.028	.82	.72	.10
9th, ...	.658	.569	.089	.78	.74	.04
24th, ...	.680	.601	.079	.78	.74	.04
25th, ...	.685	.596	.089	.79	.75	.04
26th, ...	.706	.607	.099	.78	.75	.03
27th, ...	.675	.595	.080	.78	.72	.06
28th, ...	.701	.619	.082	.80	.75	.05
29th, ...	.710	.646	.064	.80	.78	.02
30th, ...	..	.611	..	..	.73	..
July,						
1st, ...	.682	.617	.065	.78	.75	.03
2nd, ...	.765	.644	.121	.80	.77	.03
3rd, ...	.801	.737	.064	.80	.77	.03
4th, ...	.804	.720	.084	.81	.80	.01
5th, ...	.768	.698	.070	.80	.80	.00
6th, ...	.757	.697	.060	.80	.80	.00
7th, ...	..	.642	..	..	.75	..
8th, ...	.704	.632	.072	.78	.75	.03
9th, ...	.696	.622	.074	.78	.76	.02
10th, ...	.703	.602	.101	.78	.75	.03
11th, ...	.687	.616	.071	.77	.75	.02
12th, ...	.666	.579	.087	.77	.74	.03
13th, ...	.629	.569	.060	.75	.72	.03
14th, ...	..	.576	..	..	.73	..

Month.	Barometer.		Range.	Aneroid.		Range.
	Max.	Min.		Max.	Min.	
July,						
15th, ...	29.646	29.574	.072	29.77	29.72	.05
16th, ...	.582	.488	.094	.72	.64	.08
17th, ...	.581	.505	.076	.71	.66	.05
18th, ...	.597	.499	.098	.72	.66	.06
19th, ...	.669	.559	.110	.77	.70	.07
20th, ...	.680	.612	.068	.78	.76	.02
21st, ...	..	.590	..	..	.74	..
22nd, ...	.667	.580	.087	.76	.74	.02
23rd, ...	.592	.505	.087	.72	.66	.06
24th, ...	.552	.485	.067	.70	.66	.04
25th, ...	.579	.487	.092	.72	.64	.08
26th, ...	.585	.526	.059	.72	.69	.03
27th, ...	.587	.530	.057	.73	.70	.03
28th, ...	..	.690	..	..	.79	..
29th, ...	.775	.690	.085	.80	.79	.01
30th, ...	.791	.727	.064	.80	.80	.00
31st, ...	.792	.728	.064	.82	.79	.03
August,						
1st, ...	.782	.706	.076	.84	.80	.04
2nd, ...	.770	.700	.070	.82	.80	.02
3rd, ...	.720	.655	.065	.80	.76	.04
4th, ...	..	.648	..	..	.74	..
5th, ...	.712	.632	.080	.78	.75	.03
6th, ...	.733	.636	.097	.79	.75	.04
7th, ...	.760	.666	.094	.80	.78	.02
8th, ...	.742	.642	.100	.80	.76	.04
9th, ...	.768	.661	.107	.83	.79	.04
10th, ...	.779	.685	.094	.84	.79	.05
11th, ...	..	.704	..	..	.80	..
12th, ...	.774	.707	.067	.84	.80	.04
13th, ...	.793	.719	.074	.84	.81	.03
14th, ...	.774	.698	.076	.83	.80	.03
15th, ...	.807	.712	.095	.86	.81	.05
16th, ...	.808	.713	.095	.86	.81	.05
17th, ...	.798	.719	.079	.86	.80	.06
18th, ...	..	.722	..	..	.81	..
19th, ...	.826	.715	.111	.85	.80	.05
20th, ...	.758	.668	.090	.81	.78	.03
21st, ...	.756	.666	.090	.86	.78	.08
22nd, ...	.807	.701	.106	.83	.79	.04

Month.	Barometer.		Range.	Aneroid.		Range.
	Max.	Min.		Max.	Min.	
August,						
23rd, ...	29.845	29.737	.108	29.87	29.80	.07
24th, ...	.806	.718	.088	.83	.80	.03
25th, ...	..	.650	..	..	.76	..
26th, ...	.761	.647	.114	.81	.78	.03
27th, ...	.804	.693	.111	.83	.79	.04
28th, ...	.826	.786	.040	.84	.81	.03
29th, ...	.809	.727	.082	.84	.80	.04
30th, ...	.786	.703	.083	.83	.79	.04
31st, ...	.819	.722	.097	.85	.80	.05
September,						
1st, ...	.844	.744	.100	.86	.81	.05
2nd, ...	..	.684	..	..	.78	..
3rd, ...	.778	.674	.104	.81	.78	.03
4th, ...	.837	.710	.127	.85	.80	.05
5th, ...	.868	.760	.108	.87	.82	.05
6th, ...	.855	.760	.095	.86	.82	.04
7th, ...	.777	.662	.115	.81	.79	.02
8th, ...	..	.633	..	..	.79	..
9th, ...	.759	.663	.096	.85	.79	.06
10th, ...	.780	.694	.086	.86	.81	.05
11th, ...	.826	.730	.096	.89	.82	.07
12th, ...	.819	.730	.089	.90	.83	.07
13th, ...	.788	.699	.089	.87	.82	.05
14th, ...	.805	.719	.086	.87	.81	.06
15th, ...	..	.816	..	..	.88	..
16th, ...	.931	.811	.120	.94	.88	.06
17th, ...	..	..	..	.94	.88	.06
18th, ...	..	..	..	.88	.83	.05
19th, ...	.822	.730	.092	.89	.82	.07
20th, ...	.871	.764	.107	.90	.84	.06
21st, ...	.871	.772	.099	.90	.87	.03
22nd, ...	..	.735	..	..	.82	..
23rd, ...	.825	.722	.103	.89	.82	.07
24th, ...	.853	.746	.107	.90	.85	.05
25th, ...	.865	.746	.119	.91	.86	.05
26th, ...	.873	.747	.126	.91	.86	.05
27th, ...	.891	.762	.129	.91	.88	.03
28th, ...	.892	.772	.120	.92	.88	.04
29th, ...	..	.776	..	..	.87	..
30th, ...	.891	.777	.114	.91	.88	.03

Month.	Barometer.		Range.	Aneroid.		Range.
	Max.	Min.		Max.	Min.	
October,						
1st, ...	29.891	29.763	.128	29.91	29.86	.05
2nd, ...	.891	.777	.114	.91	.85	.06
3rd, ...	.856	.731	.125	.90	.85	.05
4th, ...	.860	.740	.120	.89	.85	.04
5th, ...	.889	.772	.117	.90	.86	.04
6th, ...	..	.767	..	..	.86	..
7th, ...	.860	.742	.118	.90	.84	.06
8th, ...	.863	.742	.121	.90	.82	.08
9th, ...	.847	.736	.111	.88	.80	.08
10th, ...	.855	.751	.104	.87	.80	.07
11th, ...	.857	.754	.103	.88	.80	.08
12th, ...	.892	.771	.121	.90	.84	.06
13th, ...	..	.764	..	..	.84	..
14th, ...	.847	.712	.135	.85	.80	.05
15th, ...	.840	.708	.132	.88	.80	.08
16th, ...	.773	.662	.111	.84	.78	.06
17th, ...	.771	.667	.104	.82	.76	.06
18th, ...	.824	.696	.128	.86	.77	.09
19th, ...	.874	.751	.123	.89	.80	.09
20th, ...	..	.755	..	..	.80	..
21st, ...	.859	.730	.129	.88	.80	.08
22nd, ...	.838	.697	.141	.88	.79	.09
23rd, ...	.804	.692	.112	.84	.78	.06
24th, ...	.772	.653	.119	.81	.77	.04
25th, ...	.787	.687	.100	.83	.75	.08
26th, ...	.807	.695	.112	.82	.79	.03
27th, ...	..	.757	..	..	.83	..
28th, ...	.855	.727	.128	.89	.80	.09
29th, ...	.862	.752	.110	.89	.81	.08
30th, ...	.874	.779	.095	.89	.81	.08
31st, ...	.913	.804	.109	.91	.81	.10
November,						
1st, ...	.903	.760	.143	.90	.80	.10
2nd, ...	.894	.774	.120	.88	.83	.05
3rd, ...	..	.785	..	..	.80	..
4th, ...	.908	.770	.138	.88	.82	.06
5th, ...	.877	.751	.126	.90	.82	.08
6th, ...	.897	.764	.133	.89	.82	.07
7th, ...	.938	.817	.121	.90	.87	.03

Month.	Barometer.		Range.	Aneroid.		Range.
	Max.	Min.		Max.	Min.	
November,						
8th, ...	29.957	29.806	.151	29.91	29.88	.03
9th, ...	.933	.766	.161	.91	.89	.02
10th, ...	..	.738	..	..	.82	..
11th, ...	.836	.697	.139	.87	.81	.06
12th, ...	.800	.664	.136	.86	.80	.06
13th, ...	.860	.738	.122	.89	.82	.07
14th, ...	.952	.820	.132	.89	.82	.07
15th, ...	.963	.831	.132	.93	.89	.04
16th, ...	.971	.831	.140	.94	.90	.04
17th, ...	..	.871	..	..	.91	..
18th, ...	.996	.842	.154	.95	.90	.05
19th, ...	.982	.839	.143	.95	.88	.07
20th, ...	.975	.864	.111	.85	.83	.02
21st, ...	30.037	.920	.117	.85	.83	.02
22nd, ...	.074	.946	.128	.85	.83	.02
23rd, ...	.051	.897	.154	.84	.83	.01
24th, ...	..	.908	..	..	.81	..
25th, ...	.047	.919	.128	.83	.80	.03
26th, ...	.050	.898	.152	.85	.80	.05
27th, ...	.008	.893	.115	.82	.80	.02
28th, ...	.034	.891	.143	.82	.80	.02
29th, ...	.042	.893	.149	.82	.80	.02
30th, ...	.026	.891	.135	.81	.79	.02
December,						
1st, ...	.035	.885	.150	.81	.80	.01
2nd, ...	..	.876	..	..	.80	..
3rd, ...	29.939	.821	.118	.81	.79	.02
4th, ...	.967	.853	.114	.80	.79	.01
5th, ...	30.001	.908	.093	.80	.80	.00
6th, ...	.013	.891	.122	.80	.80	.00
7th, ...	29.996	..	..	.80	..	..
8th, ...	..	.837	..	..	.78	..
9th, ...	.998	.860	.138	.81	.81	.00
10th, ...	30.000	.876	.124	.80	.80	.00
11th, ...	.028	.900	.128	.81	.79	.02
12th, ...	29.998	.878	.120	.80	.79	.01
13th, ...	30.009	.896	.113	.80	.79	.01
14th, ...	.048	..	..	.82	..	..
15th, ...	..	.932	..	..	.81	..

Month.	Barometer.		Range.	Aneroid.		Range.
	Max.	Min.		Max.	Min.	
December,						
16th, ...	30.069	29.934	.135	29.83	29.82	.01
17th, ...	.067	.931	.136	.84	.82	.02
18th, ...	.025	.912	.113	.83	.80	.03
19th, ...	.046	.933	.113	.84	.80	.04
20th, ...	.064	.923	.141	.85	.83	.02
21st, ...	.058	..	..	.85	..	..
22nd, ...	..	.951	..	..	.82	..
23rd, ...	.061	.924	.137	.85	.81	.04
24th, ...	.021	..	..	.84	..	..
25th, ...	..	.880	..	..	.80	..
26th, ...	.018	.914	.104	.84	.80	.04
27th, ...	.003	.889	.114	.86	.81	.05
28th, ...	.041	..	..	.85	..	..
29th, ...	..	.914	..	..	.82	..
30th, ...	.051	.917	.134	.87	.81	.06
31st, ...	29.985	.852	.133	.84	.80	.04

The following observations have been sent to me by Capt. Thuillier, Deputy Surveyor General of India.

Comparison of an Aneroid Barometer, No. 3064, by Dent, with the standard in the Observatory at Calcutta.

Days.	Time of Observation.	Standard Bar.	Attached Ther.	No. 3064 An. Bar.	Difference of Bar.
March 23	Sunset	30.070	88.8	30.066	.004
„ 24	Sunrise	.096	69.3	.087	.009
	9 h. 50 m.	.206	89.2	.200	.006
	Noon	.184	93.7	.175	.009
	2 h. 40 m.	.110	95.7	.104	.006
	4 P. M.	.096	96.2	.087	.009
	Sunset	.080	90.2	.066	.014
„ 25	Sunrise	.100	72.0	.092	.008
	9 h. 50 m.	.198	84.5	.187	.011
	Noon	.178	91.3	.172	.006
	2 h. 40 m.	.108	94.3	.100	.008
	4 P. M.	.082	95.2	.079	.003
	Sunset	.066	90.0	.062	.004
„ 26	Sunrise	.088	71.8	.087	.001
	9 h. 50 m.	.184	85.3	.183	.001
	Noon.	.166	92.7	.166	.000
	2 h. 40 m.	.098	97.0	.100 *	.002
	4 P. M.	.084	97.3	.085 *	.001

The following observations were made at Poona in July and August.

The Standard Barometers employed were Nos. 1 and 2, the finest sent out by Mr. Adie, the way they kept together was quite admirable. The Mountain Sympiesometer referred to was a very elegant instrument procured for Col. Campbell, whose indications were also very accurate, and in most perfect harmony with those of the other instruments.

On comparing the instruments at Sewree, about 70 feet above the level of the sea, they stood on the 22nd July at 10 A. M. as under, the Thermometer being 84°, the correction for temperature of the Barometer here applied .149—the Standard at the Observatory at this date was 29.667, the instrument being 32 feet above the level of the sea.

Barometers.		Mountain Sympiesometer.	Aneroids.		
I.	II.		5821	5822	2244
29.676	29.662	29.750	29.765	29.790	29.780

The following were the readings of the instruments respectively at Poona at 10 A. M. on the 27th—the Observatory Standard had betwixt these two dates sunk from 29.667 to 29.587 or by 00.080 :—

Temperature at Poona 76°—Barometer corrected

I.	II.	Symp.	Aneroid.	Aneroid.	Aneroid.
27.713	27.713	27.830	27.800	27.802	27.650

Difference betwixt Poona and Bombay.

1.963	1.949	1.920	1.965	1.988	2.130

The coincidences here betwixt the barometer and mountain sympiesometers, and Mr. Treacher's Aneroids, are as close as may be.

These experiments were performed at Col. Grant's at the extreme end of the Artillery lines, his house is pretty nearly on a level with the church, the top of the spire of which is set down in the Trigonometrical Survey at 2038 feet above the level of the sea. Mr. Treacher's instruments were only cut to 27.5 inches, and that belonging to the Society cut to 23 was unserviceable. I took our own Aneroid to the top of Bap-dieu Ghat along with me—the following were the results; but as already stated the instrument was unserviceable, so that no conclusion from its indications, can in this case be drawn—the perfection of the Mountain Sympiesometer is very remarkable :

Bap-dieu Ghat, August 23rd.

	Barometer I.	Symp.	Ther.
Poona, 7 A. M.....	27.952	28.05	76
Bap-dieu Ghat, 9 A. M.	26.747	26.85	74
	1.205	1.20	

The Barometer is corrected for temperature to 32°.

The Barometer at the Colaba Observatory stood on the 23rd August at 29.845 or 1.893 higher than that at Poonah: if to this be added .030 for the difference betwixt 7 A. M. at which the upper instrument and 10 A. M. at which the lower one was read, we shall have a difference of 1.923, or adding 3 for difference of elevation betwixt the Colaba and Sewree Standard, almost exactly the same as that originally set down as the result of the first comparison. At Poona the range betwixt the 26th, and 31st July was about .040, that at Bombay about .070, that for the latter part of August at Bombay about .090: I have no note of the Poona range of this date, but assume it at 6, and have taken the half.

While in Poona I took with me three Aneroids with a Sympiesometer into the carriage, and drove over the station to see with what facility the instruments could be employed in flying surveys. I did this repeatedly. On one occasion I was accompanied by Col. Grant: on another by Captain Stoddart: it is needless to give details—compared with the barometer the coincidences were of course always wonderful: on one occasion we took a series of levelled stations, where the accuracy was surprizing. The great recommendation, both in their case and that of the Sympiesometer, was the facility with which they could be observed: by pulling up the horses for a couple of minutes the scale could be read and marked at once, and one hundredth of an inch being allowed for ten feet of change of level, which it is at this elevation pretty nearly, no reductions of any sort were requisite—these could be performed at home afterwards.

The following paper is by Professor Patton—it gives the merits of the experiments, with the Aneroid up to 4500 feet: it has been published in the *Bombay Times* and no where else that I am aware of.

"Considerable discussion has of late arisen on the subject of the Aneroid Barometer, and great uncertainty still exists in reference to

its utility. A letter from the eminent instrument-maker, Mr. Adie, read before a late meeting of the Society, has tended very much to increase previously existing doubts of its usefulness in ascertaining high altitudes, for which its portability and cheapness would have made it particularly suitable. This Society also having ordered a supply from England, it is of great importance not only to have those doubts set at rest, but also to have some means of testing their correctness in order to inform purchasers of the limits within which they can be trusted. In order to do so, I obtained two Aneroids, one belonging to Mr. Treacher, graduated to 27.5 inches, and one belonging to the Society, graduated to 23 inches, and subjected them to the following experiment. In the neck of a flask containing a small quantity of mercury, I inserted a small bent tube, and when the flask was inverted, the mercury of course stood at the same level in the flask and in the tube.

"The flask was properly supported on a small retort stand, and the Aneroids were then placed under the receiver of an air-pump, and a few strokes given to the pump. When the air became a little rarified in the receiver, the elastic force of the air in the flask pressed down the mercury, and the degree of exhaustion was measured by the altitude to which the mercury rose in the tube. Therefore, neglecting for the present the diminution of the elastic force of the air in the flask arising from the increase of volume and neglecting also the temperature under the receiver, the *rise* of mercury in the tube should be exactly equal to the *fall* indicated by the Aneroid, and vice versa. And this was the case in each of the experiments, as will be seen from the readings given below. The air was first pumped out, and the receiver, not being perfectly air-tight, it re-entered gradually, and readings were taken at the same instant by myself and Mr. Ardaseer Framjee.

"Teacher's Aneroid.—No. 1.

Aneroid.	Height of Mercury in tube.
Inches.	Inches.
27 ·5	2.55
28 ·0	2.25
28 ·5	1·55
29 ·0	1.05
29 ·4	0·55
30·05	0.00

"Aneroid.—No. 2.

"1st Experiment.		2nd Experiment.	
Aneroid.	Height of Mercury in tube.	Aneroid.	Height of Mer. in tube.
Inches.	Inches.	Inches.	Inches.
26 .0	3 .9	24 .5	4 .75
26 .5	3.35	25 .0	4 .25
57 .0	2 .8	25 .5	3 .7
27 .5	2.35	26 .0	3 .2
28 .0	1.85	26 .5	2 .7
28 .5	1.35	27 .0	2 .2
29 .0	0.85	27 .5	1 .7
29.25	0 .6	28 .0	1 .2
		28.25	0.975
		28 .5	0 .7
		28.75	0.425
		29 .0	0 .2
		29 .7	0 .5

"From these experiments I felt satisfied that the Aneroid No. 2 would not differ from a mercurial barometer by more than one-tenth of an inch, if carried to a height of six thousand feet. Since these experiments were made, I have had an opportunity of taking it with me to Mahábaleshwar, and of comparing it with the Sympiesometer, and the results given below show how accurately my anticipations have been fulfilled,—at least as far as 4500 feet. Dr. Buist's observations at Poona had already proved its correctness to the height of 2000 feet.

	Aneroid.	Sympr.	Ther.	
October	19.—29. 8	29.56	90.0	12 o'clock noon—level of sea.
,,	19.—27.725	29. 5	83.5	3 Do. do. do.
,,	20.—29. 85	29.65	83.6	9½ A. M. Mhar River.
,,	20.—29.155	28.93	85.5	5½ P. M.
,,	20.—25. 79	25.54	68.5	9½ P. M. Monastery, Mahábaleshwar.

"The coincidence between the two instruments is seen to be very exact, the total fall of the Aneroid being 4.01, and of the Sympiesometer 4.02.

"The following are the readings of the Aneroid and Thermometer at different places between Mahábaleshwar and Poona.

	Aneroid	Ther.	
October	21.—25.756	65.0	9½ A. M. Monastery, Mahábaleshwar.
„	21.—25. 9	68.0	4 P. M. Top of Tai Ghaut.
„	21.—27.175	72.0	5 P. M. Bottom of do.
„	22.—27. 75	73.5	Top of Ghaut.
„	22.—27. 88	75.5	Bottom of do.
„	22.—26.725	81.0	Top of Ghaut near Poona, 6 P. M.
„	22.—27. 87	80.0	Poona lines. 10 P. M.
„	23.—27. 77	81.5	Do. do. 4½ P. M.
„	23.—27. 87	78.5	Do. do. 10 A. M.

"A very slight examination of these observations will show how sensibly the Aneroid is acted on by the smallest undulations of the ground, and that it acts as freely at 25 inches as at 30.

"They make no pretence to great accuracy, because most of them were taken when the palkee in which I was carried was in actual motion, but this only proves more strongly the value of the instrument for general purposes.

"When the merits of the Aneroid become known, and confidence is placed in its indications, it will probably supersede all other portable instruments for ascertaining the heights of mountains: I have therefore prepared the following table, which will enable any one who can multiply and divide, to obtain altitudes with all the accuracy that is required for practical purposes. The formula used in the calculation is given by Poisson in the second volume of his *Traite de Mechanique*:

$$Z = 18393 \ldots \left(1 + \frac{2(t+t')}{1000}\right) \text{Log.} \frac{h}{h'}$$

"Where t and t' are the temperatures of the air in degrees of the centigrade thermometer at the two places of observation, h and h' the length of the barometric columns, and Z the height in Metres.

"Table to facilitate calculations of heights of mountains.

32°	52416	47°	54163	62°	55911	77°	57658
33	52532	48	54280	63	56027	78	57774
34	52649	49	54396	64	56143	79	57890
35	52765	50	54512	65	56260	80	58007
36	52882	51	54629	66	56376	81	58124
37	52998	52	54745	67	56493	82	58240
38	53115	53	54862	68	56609	83	58356

39	53231	54	54979	69	56726	84	58472
40	53348	55	55095	70	56842	85	58589
41	53464	56	55211	71	56959	86	58706
42	53581	57	55328	72	57075	87	58823
43	53697	58	55444	73	57192	88	58939
44	53814	59	55561	74	57308	89	59055
45	53930	60	55677	75	57424	90	59172
46	54046	61	55794	76	57541	91	59288

"Rule.—Multiply the number in the table opposite to the mean of the temperatures of the two places in degrees of Fahrenheit, by the difference of the barometric heights, and divide by their sum. The quotient is the height in feet.

"Example.—On the 20th October, 1850, the barometer stood at 29.85 in the Mhar river near the sea, the thermometer indicating 83.5; and at the Monastery Mahábaleshwar it fell to 25.79, and the thermometer to 68.5. Required the height. Here the mean temperature is 76°, opposite to which in the table is found 57541, which being multiplied by 4.06, the difference, and divided by 55.64, the sum of the barometric heights, gives 4198 feet, the height required.

"Table of Heights found by the Aneroid.

Kenesore above the level of the sea, ...	feet	665
Monastery Mahábaleshwar, ...	feet	4198
Mount Charlotte above the Monastery, ...	feet	324
Mount Charlotte above the level of the sea, ...	feet	4527
Tai Ghaut, ...	feet	1362
Height of Ghaut above Poona, ...	feet	1216
Poona above the level of the sea, ...	feet	2025

"These heights, as far as I have been able to ascertain, coincide very nearly with the heights ascertained by other means. Indeed no single observation of the barometer at one of the places could be expected to give it more accurately.

"Leslie's rule is very convenient, and sufficiently accurate; but the correction for the temperature of the air at the two places is often neglected in practice,—and even in some scientific works the fact of a correction being required is not mentioned. But this correction cannot be omitted, because in the case of Mahábaleshwar it amounts to upwards of 400 feet, and in the case of Poona to about 180 feet. The

results, however, are always too small, because in his investigation, he was only anxious to obtain an approximation, and neglected systematically all but round numbers, and all the omissions tended to reduce the apparent height. Near the equator the diminution of the force of gravity is another source of error, which still more diminishes the height deduced from the usual formula. I have therefore used, in the formation of the table given above, the number 52416, deduced from Poisson's formula, in preference to 52000 used by Leslie. Besides the thermometers in general use being graduated according to Fahrenheit's scale, it is inconvenient to be obliged to convert the degrees into those of the centigrade. As some persons may prefer the use of his rule, I add it, with the example given above worked out.

"LESLIE'S RULE.—As the sum of the mercurial columns is to their difference, so is the constant number 52000 feet to the approximate height. Correct the approximate elevation by shifting the decimal point three places back to the left, and multiply by twice the sum of the degrees of the detached centigrade thermometer; this product being now added, will give the true height.

"Taking the former example, we have—55.64 : 4.06 : 52000 : 3793, the approximate height and the correction is 3.798 ft. + 99.7 = 378, which gives for the true height, 4171, differing from the former by 27 feet.

"Of the more minute daily variations, and the corrections, if any, that are to be applied. I hope to be able to have some account for the next meeting of the Society.

"21*st November*, 1850. JOSEPH PATTON."

It appears to me that at home the value of the Aneroid has been greatly underrated; and that it has been looked on notwithstanding all the noise that has been made about it, as little better than a house weather-glass fit enough to take the place of the wheel barometer, but fit for little more. Nothing certainly can be more ridiculous than the legends "SET FAIR," "CHANGE," "RAIN," "MUCH RAIN," "STORMY," &c., with which the instruments have been marked when they are meant to be employed for survey purposes. In the Dekhan or wherever an elevation of 2000 feet is obtained, the Aneroid indicates throughout the year, a state of perpetual tempest. And not only does this tend to bewilder and mislead, but it occasions the loss of

much valuable space on the dial-plate of the instrument, which might be valuably occupied otherwise. The brass index or register may be expedient at home where the Aneroid is used as a weather-glass merely, by people too indolent or slovenly to write down their observations. Here it is an incumbrance constantly in the way, and liable to bring about the breaking of the glass, and ought, accordingly, to be discarded. The Aneroid, as used at home, is generally cut from 27.5 to 31 inches, so that at altitudes above 2500 feet it is useless. It ought to be graduated all round the scale, or at least as low as 23 inches; and in this case it would suit for the survey of the Neilgherries.

The Dial, as I shall call it, or Index-plate of the Aneroid, is about 4 inches in diameter, the scale is engraven about half an inch from the edge of the dial, and is by consequence 9 inches in circumference. When engraven all around it reads from 23 to 31 or over a space of 8 inches, each space corresponding to a barometric inch, being therefore in reality 1.125 inches, this is divided into tenths, each tenth being subdivided into quarters, so that the instrument reads to 0.025, it may be estimated to half this or 0.0125.

The space between the present scale and the extreme edge of the dial is half an inch in breadth all around, and is occupied by the words "stormy," "much rain," &c., calculated, as already stated, only to mislead us in India. Were these to be omitted and the thermometer which at present occupies the other margin of the dial-plate to be sunk, so as not to interfere with this scale or sweep of the index, a large portion of valuable space would be gained. The scale might now be cut half an inch further out so that one inch of the barometer would be represented by 1.5 instead of by 1.125 as at present. This may easily be subdivided into hundredth parts capable of being read to half this, or 0.005. Troughton's Marine Barometers when meant to be read without vernier are cut to hundredth parts of an inch, each division being a third less than those recommended for the Aneroid. As already stated, the brass index is a mere encumbrance endangering the glass and constantly in the way; and the steel index ought to be made very much finer than it is at present—as fine in fact as the second hand of a stop-watch. Reducing its dimensions besides improving the delicacy of the reading diminishes the mass and momen-

tum, and so rids us of the tremor and vibration to which it is liable when moved about.

The improvements suggested are all too obvious to require to be more than mentioned. They can be carried out without in any way increasing the expense, size, or complexity of the instrument, and ought to be insisted on by all those ordering Aneroids for survey purposes or for service of any sort in India.

Mr. Adie of Edinburgh states that below 28 inches he finds the Aneroid uncertain, and untrustworthy in its indications. Mr. Patton's experience is at variance with this; but should Mr. Adie's views prove correct, one set of instruments might be cut from 31 to 28; a second from 28 to 24, and so carrying down the series as far as might be considered desirable. The first set might serve for elevations under 3000 feet; the second commencing at 3000 might carry us to 6000 and so on. The instruments might easily be tested under the receiver of an air-pump without any actual ascent, the barometer guage with a good scale answering as well as the barometer itself.

The neatly-glued, leather-covered, velvet-lined box in which the Aneroid is enclosed is unsuited for India, a hot Dekhan wind will warp, twist and split it into pieces, a wet monsoon atmosphere liquify the glue, mould the cover and rot the lining. To meet the risks of climate and rough usage it ought to be provided with a strong case of copper, brass or zinc of nearly the form of the instrument. This should be stuffed with hair, with scraps of cork, India rubber, gutta percha, or fitted up with springs so as to diminish the risk of concussion or vibration. It should be then enclosed in strong leather like a powder flask or spyglass, with straps and buckles for convenient carriage.

Chronology of Makkah and the Hijáz before Mohammad chiefly founded upon Genealogy.—By Dr. A. Sprenger, *Secretary of the Asiatic Society.*

The following genealogical tables intended to illustrate the chronology of the chiefs of the *H*ijáz before Mohammad have been derived from the following authorities.

The genealogies of the Amelekites and Jorhomites have been taken from the Kitáb alaghány and Mas'údy the latter is also in Abú-lfedá but somewhat different and in Khoshaybary. The latter author differs from both these authorities: according to his statement Lahy لهي was the leader of the Jorhomite colony which settled in the Hijáz, and he was the son of Obayy b. Jorhom II. b. al-Ghawth b. Shaddád b. Sa'd b. Jorhom I. b. Qa*ht*an.

The genealogy of the mother of Qoçayy which appears to me very important and that of the Khozá'ahites from Abú Ghobshán up to Lo*h*ayy have been taken from Wáqidy and the Tarykh Khamys.

I calculated three generations to one hundred years. This is somewhat too high in ordinary cases but it was the only means to bring the synchronisms into harmony. From Qoçayy to Mohammad I calculated the generations even higher than at thirty-three years each for reasons stated in the table. Mohammad is five generations from Qoçayy but Suwaybit a contemporary of Mohammad and some others were the seventh generation removed from him and *H*amzah who was of the same age as Mohammad only four. 'Abd al-Mo*tt*alib the grandfather of Mohammad married at the age of upwards of seventy a young woman and she gave birth to *H*amzah. This is therefore an exceptional case. Taking the average of all the genealogies of the descendants of Qoçayy, which we know, we find that six generations intervened between Qoçayy and Mohammad or about two hundred years. According to this calculation Qoçayy was born about A. D. 370.

Note.—Before the names of those men who were the chiefs of the Hijáz is an asterisk.

Born B. C.	*Genealogy of the Amelekites, of the Hijáz and of Zenobia.*	*Genealogy of the mother of Qoçayy.*	*Genealogy of the Jorhomites.*	*Genealogy of the Khozá'ahites.*	
		Azd.	Qahtán	Azd.	
		This is the name of a tribe and not of a person.	supposed to be the Joctan of Scriptures.	This is the name of a tribe and not of a person.	
333	.....	*Naçr.	Jorhom.		
300	.....	*Málik.	Name of the tribe and not of a person.		
266	.....	*'abd Allah.			
233	.....	*Ka'b.		Mázin	
200	.....	*al-*Hárith*.		the supposed father of several tribes.	
166	.....	*Ka'b.		Tha'labah Ghassány	
133	.....	*Zahrán.		the supposed father of the Ghassánnite tribe.	
100	Jondán or *Hamrán*.	*Nadhr.	Nabt or 'Abd Yalyl.		
	These no doubt are the names of persons and not the names of tribes. I therefore take it for a genuine genealogy of the earliest rulers of the Hijáz.				
66	Karkar.	*Dohmán.	Haná or Jorsham or Jorhom II.		
	This is the name of the tribe according to Mas'údy.				
33	Qatúrá.	*ça'b.	Al-Raqyb or 'Abd Madán.		
	This is the name of the tribe according to the Kitáb alaghány.	Sabus was the name of the king of the Hijáz at the time of Elius Gallus mentioned by Shrabo about 24 years B. C.			
A. D.					Born A. D.
1	Lawy.	*Morshir.	Sa'd or Naghylah or Málik.	Amr Al-Qays Bitryq (i. e. Patricius.)	1
33	*Hawbar.	Yashkor.	'Amr or Zayd or 'Abd Masyh (i. e. Servant of Christ.)	*Hárithah Ghitryf*.	33
		His name occurs in the Tarykh Khamys but not in Wáqidy.			
66	*Samayda'.	Jotho'mah.	*Midhádh I.	'Amir Má-Alsamá.	66
	Being defeated by Midhádh I. he leaves Makkah and retires to Mesopotamia.	Father of an important family. He joined the tribe called al-Dyl b. 'abd Monáh b. Kinánah as confederate. It is said that he was a contemporary of 'amr Mozayqiyá.	First Jorhomite king of the *Hijáz*; expells the Amelekites from the *Hijáz*.		
		'amr.	*Al-*Hárith*.		
100	Odzaynah.		His grand-daughter was married to Lohayy.	'Amr Mozayqiyá. Leader of the Azdites.	100

133	HASSÁN.	'ÁMIR JÁDIR. Flourished during the Jorhomite supremacy over the Hijáz according to the *Kitáb alaghány*. Married the daughter of the Jorhomite king al-*Hárith* b. Midhádh I. according to the Tárykh Khamys. Was the first who surrounded the Ka'bah with a wall.	*'AMR.	*HÁRITHAH.* According to some authors he defeated Midhádh II. and expelled the Jorhomites from the *Hijáz*. But according to others they were expelled by his grandson 'amr.	133
166	TARIB.	GHANM. This name is in the Tárykh Khamys but not in Wáqidy.	*MIDHÁDH II. is expelled by the Azdites and retires to Syria. The Khozá'ahites who belonged to the Azdites are henceforth the ruling tribe of the *Hijáz*.	RABY'AH called LOHAYY. His ancestors are not known. Some say he was a son of Qama'ah, others give the genealogy which I give here and most authors do not give his genealogy at all. *Tabary* says that his wife Fohayrah, daughter of 'ámir was the grand-daughter of al *Hárith* b. Midhádh I.	166
200	'AMR. Slain by Jazymah the first king of Hyrah.	'AWF.	.....	*'AMR. Founder of the Khozá'ahite tribe and power. Is said to have changed the religion of the *Hijáz*.	200
233	AL-ZABBA. Sister of Zenobia slain by 'amr b. 'adyy the second king of *Hyrah* about A. D. 260.	*HAMÁLAH.*	.....	*KA'B, His sister Máwiyah was married to 'amr King of *Hyrah* who succeeded to the throne A. D. 268; and his daughter Hind was married to Amr al-Oays king of *Hyrah* who succeeded about A. D. 288. (*Hamzah* Isf. p. 100).	233
266	.....	KHAYR called SAYAL.	.....	*SALÚL.	266
300	.....	SA'D.	.....	*HOBSHIYYAH.	300
333	.....	FÁTIMAH mother of Qoçayy to whom she gave birth about A. D. 375. She was then old.	.....	*HOLAYL, Father-in-law of Qoçayy, who had married his daughter Hobbá. *ABÚ GHOBSHÁN AL-MOHTARISH, Contemporary with Qoçayy to whom he sells the keys of the Ka'bah.	333

Chronology from Qoçayy to Mohammad founded on Genealogy.

	Probable date of birth. A. D.
*Qoçayy. The founder of Makkah. His genealogy is uncertain.	370
'Abd Monáf, Second son of Qoçayy; his elder brother 'abd al-dár was grown up when Qoçayy conquered the Ka'bah from the Khozá'ahites.	410
Háshim, Second son. Háshim was grey when he begat 'abd al-Mo*tt*alib and died soon after his birth (Wáqidy.) But according to others (*Tár. Khamys*) he died at the age of 20 or 25 years. I have shown in my Life of Mohammad, page 30, that this is an error. The former account is confirmed by the fact that Háshim's rivals were Omayyah the son of his younger brother and 'ámir (b. Háshim b. 'abd Manáf b. 'abd al-dár) the grandson of his uncle. We may therefore suppose that he was upwards of 50 years old when he begat	442
'Abd al-Mottalib, Died in A. D. 579 at an age of 82 *lunar* years and was therefore born in A. D. 500. 'abd al-Mo*tt*alib was 47 years old when he begat	500
'Abd Allah, Died in February, 571, before the birth of his son at an age of about 24 years.	546
Mohammad, Born in A. D. 571.	571

Literary Intelligence.

1. کھیت کرم A treatise on agriculture in Urdu compiled by order of the Lieutenant-Governor of the North Western Provinces, by Kalee Ray, Deputy Collector of Futtehgurh, 2nd edition, Delhi, 1849, 8vo. 54 pp. (lithographed). It treats on the different kinds of soil, the tools used in agriculture, on the modes of watering the fields, &c.; but the principal object of the book is to acquaint the agricultural population with the manner in which the revenue is collected and in which they can defend their rights. It is illustrated by coarse drawings and great attention is paid to the technical terms which are printed in the Nagree character as well as in the Persian, and carefully explained. I need not say that few of them are to be found in dictionaries and therefore this little volume is very useful.

2. فتح کڈھ نامہ A statistical account of the zillah of Futtehgurh in Urdu by the same author, equally compiled by order of the Hon'ble J. Thomason, Delhí, 1849, large 8vo. 204 pp. lithographed. This is an admirable work, besides a most elaborate statistical report, it contains a historical account of every village in the district, genealogical tables of distinguished families, &c.

3. آثارالصنادید A descriptive account of the antiquities of Delhi, in Urdu by Sayyid Ahmad, Moonsif of Delhi: Delhi, 1847, 8vo. lithographed. The book was undertaken at the suggestion of A. Sprenger. It contains a great number of lithographic drawings which though well drawn are very badly printed. Though it is not free from mistakes it may clear up many errors of even distinguished travellers and Geographers. Balbi identifies the iron lát in the ruined mosque at the Qo*t*b with Fyrozshah's lát or pillar, and he says that old Delhi extends as far as the Qo*t*b. Ritter is hardly more correct. He makes Diwan Kost of Diwáni Kháçç دیوان خاص and Yamuna Masjid of Jámi' Masjid مسجد جامع, i. e., the principal mosque or Jum'ah Masjid مسجد جمعہ, i. e., Friday mosque. The natives give it the former name in writing and the latter in speaking, and the Europeans erroneously call it Jamnah Masjid, thinking that it is called so from the river Jamnah, but Yamuna Masjid I have never heard. He identifies Fyrozsháh's Kótlah which is close to the walls of Sháhjahánábád, or modern Delhi, with the Puráná Qal'ah which is two miles farther south. The former is on the northern and the latter on the southern extremity of the ruins of *old* Delhi, and from the gate of the one to that of the other you can still trace the chauk or corso of the ruined city. The Qo*t*b Minár has not its name from Qo*t*b aldyn Aybak as Ritter supposes but from the Saint Qo*t*b aldyn Baktyár Káky who is buried not far from it.

4. The Bostán of Sa'dy lithographed in Mo*h*ammad Mostafá Khán's press, Lucknow, A. H. 1265, 2nd edition of the same press. I mention this edition on account of the great care which has been bestowed in correcting the text and fixing the vowels of doubtful words. This edition has marginal notes some of which are useful. This is one of the few specimens of native criticism which has been awakened by the progress of printing among them. A learned man thinks it well worth his while to bestow his time on the edition of a correct text though he might not feel inclined to waste it in correcting a single manuscript,

and the competition of the Printers renders it necessary that they should publish good texts.

5. The Bostán of Sa'dy printed in types at Hooghly, A. H. 1264. Not much pain has been bestowed on this edition.

On the 30th July, died at Calcutta, Mowlawy 'Abdur Rahym, who is the author of several works, the method of which approaches to the European taste. His principal performance is the منتهى الارب فى لغات العرب Calcutta A. H. 1257, 4 vols. 4to. This is a translation of the Qámús made by Mohammad Habyb Allah who preserved the arrangement which is in the Arabic original and gave it the title of Qábús. Mowlawy 'Abdur Rahym has arranged the roots according to the first letter of the alphabet and he enumerates the derivatives of every root in systematic order, and made many other useful alterations and improvements. This book does not render the original text of the Qámús superfluous, but it contains a greater number of proper names than the original which renders it very useful for reference. Other works of the late Mowlawy are an Arabic grammar explained in Persian called غاية البيان Calcutta 1828, 4to. حل الشواهد Calcutta A. H. 1256, 8vo. 119 pp. This is chiefly derived from Razy's Commentary on the Sháfiah. It contains an explanation of the examples contained in the Sharh Mollá. The seven Mo'allaqats with an Arabic commentary, Calcutta 1823, 8vo. the commentary is chiefly derived from Zauzany. He may also be considered as the editor of a Persian Tazkirah called مرأة الخيال by Shyr Khán Lódy though it bears the name of his son Ahmad. It was compiled in A. H. 1102 and published in A. D. 1831.

A new edition of the Raghuvañsa with the commentary of Mallinátha will, we are informed, shortly issue from the Sanskrita Press of Calcutta. This press from its foundation has been very usefully employed in printing some of the standard works of the Bráhmaṇic literature, and among those already published we find the *Kumára Sambhava* and *Meghaduta* of Kálidása, the *Kádambari* of Bánabhatta, the *Sisupála-Badha* of Sri Harsa, the *Dasakumára charita* of Dandi, the *Anumána-chintámani* of Raghunátha Siromaṇi, the *Tattvakaumudi* of Váchaspati Mis'ra, and the *Sábda-s'aktiprakás'iká* of Jagadís'a Tarkálaṅkára. The name of Professor Madanamohana Tarkálaṅkára on the title page is

a sufficient guarantee that the works are correctly printed, but we must observe that in Europe these editions will not be considered to have been "edited:" indeed they have no pretension whatever to be so called. None of them have any preface, and their readers are left entirely in the dark as to the authenticity of the MSS. from which they have been printed—the history of those MSS.—the names of those who wrote them—the age in which they appeared—the place whence they were procured—and every thing else connected with their literary fidelity and worth. We allude to this subject the more particularly as we find that no attention has been paid to note down the variants which are always met with in collating MSS., and the first chapter of one of the works, the Dasakumára, has been omitted without giving any reason for such omission. Professor Wilson, we know, has expressed some doubts regarding the authenticity of the chapter in question, but he has nevertheless retained it in his edition of the work, thinking it better that his readers should have the doubtful chapter, and with it an opportunity to judge for themselves, than be deprived of the introduction to a romance. In editing oriental classics, we wish that sufficient regard be shewn to obtain the use, and to point out the peculiarities, of good and ancient MSS., and that our Calcutta Schultenses and Erpeniuses may more carefully follow the footsteps of their European prototypes.

There is a strong current setting in, favourable to Bengali Literature, which augurs well as to the future prospects of Sanskrita lore, for the Sádhu Báshá or classical Bengali is so identified with the Sanskrita, that the students of the former are naturally disposed to cultivate the latter. We hear then with great pleasure that the principal of the Sanskrita College, Isvarachandra Vidyásagará is preparing a Sanskrita Grammar in Bengali, which will be adapted to late improvements in philological science, and is designed to smooth the path to this difficult language, but which has been made more intricate by the mystifications and scholasticisms of pandits. Along with this grammar a series of selections from Sanskrit writers will be given. We hope one day to see the Sanskrita College of Calcutta, a fount for a useful Vernacular Literature—and a model for an improved mode of learning Sanskrit.

A publication presenting quite a novelty in Bengali Literature has lately made its appearance, the Satyárnab, a monthly Magazine of

twelve pages Quarto with two wood-cuts. The Journal is designed, like the Penny and Saturday Magazines in England to impart through the Vernacular tongue interesting and useful information, to combine the *utile cum dulci*. The work is printed at the Encyclopedia Press in Calcutta conducted by native Christians, and the price is only one rupee eight annas a year. Besides papers on practical religious subjects, the Magazine is designed to contain a series of articles on Natural History, Mohammadan history, biographies of eminent Englishmen in India, sketches of Hinduism, and Christian biography. The present number contains a very good article on Caste, which is to be continued.

A translation into Bengali of an excellent work, Chamber's Moral Class Book has just appeared; the style is good, and by the illustrative anecdotes it is well adapted for school and general reading. A Bengali Dictionary on the plan of Haughton's with all the meanings in Bengali is passing through the Purṇachandrodaya press, compiled by the Editor of the Purṇachandrodaya, who has rendered much benefit to his countrymen by the well executed useful works that have at various times issued from his press. Robinson Crusoe in Bengali, and the lives of Columbus and Peter the Great, will shortly be published under the auspices of the Vernacular Translation Society. We hope the same Society will also shortly issue under their patronage a Penny Magazine in Bengali. To the kindness of the Hon'ble J. D. Bethune and of Knight, the London Publisher, Bengali Vernacular Literature is deeply indebted for the valuable supply of type-metal cuts which have been furnished to illustrate Bengali publications.

We have received from Mr. F. E. Hall, of Benares, the following list of books lately published at that city.

List of works published by order of Government, North Western Provinces, for the use of the Benares College.

1. Elements of English Grammar, Sanskrit and English, ..		1847
2. Outlines of Sanskrit Grammar in Hindí, ...		1848
3. Vidyá Chakra, or Lectures on the relations of knowledge.	No. 1, English and Sanskrit,	1848
,,	No. 2, ,, ,,	1849
,,	No. 3, ,, ,,	1849
,,	No. 4, ,, ,,	1849

4. Laghu Kaumudí in Hindi, Part I,..... 1849
5. Tarka Sangraha. Text, Translation and Original Comment, 1849
6. Tattwa Samása, ditto ditto, ... 1850
7. Nyáya Sútra Vṛitti, Part I, ditto ditto,..... 1850
8. Reprints for the Pandits, No. I, containing Harris's Essay or Art, with Introduction,..... 1850
9. Reprints for the Pandits, No. II., containing Introduction to the Philosophy of Induction, following the order of Mr. J. S. Mill's System of Logic, Ratiocinative and Inductive, . 1851
10. Vedánta Sútra, Part I. Text, Translation and Original Comment, ... 1851
11. Kanáda Sútra, Part I, ditto ditto, ... 1851
12. Vedánta Sára, ditto ditto, ... 1851
13. Bháshá Parichcheda and Sidhánta Muktávalí, Part I, ditto, 1851
14. Laghu Kaumudí. Text and Translation with Elucidations and References, ... 1851
15. Algebra in Hindí, Vol. I. By Bapú Deva, ... 1851

In Preparation.

1. Synopsis of Science, being an Encyclopædic View of Human knowledge, moulded on the Sútras of Gotama, English and Sanskrit.
2. Sanskrit First Lessons, on the Method of Ollendorf.
3. Yoga Sútra. Text, Translation and Original Comment.
4. Mímánsá Sútra, ditto ditto.
5. Anumána Khanda of the Chintámani.
6. Mahábháshya, with its Commentaries, the Kaiyyata and Vivaraṇa. Sanskrit text.
7. The Sequels to the Part I. of the Nyáya Sútra Vṛitti, &c. &c.

Works Published in Sanskrita.

संस्कृत पुस्तकानि ।

अमरकोश सटीक
सारस्वत
षटपदाभिका
लघु कौमुदी
विष्णुसहस्रनाम श्वेत अक्षर
शिवताण्डव
गङ्गाऽष्टक
शिवस्तोत्र
मणिकर्णिकाऽष्टक
विश्वेश्वराऽष्टक

मेघदूत सटीक
तर्कसङ्ग्रह सटीक
पाराशरी होरा
महिम्न स्तोत्र
अन्नपूर्णाऽष्टक
भैरवाऽष्टक
नित्यकर्म
अष्टाध्यायी

In Press.

अमरकोश रामाश्रमी टीका सहित
रघुवंश सटीक

Works Published in Hindi.

भाषाकी पुस्तकें।

तुलसीकृत रामायण पं-बद्रीलालकी
तुलसीकृत रामायण-ढुंढीराज पर की
उपदेश दर्पण
वर्णमाला शिक्षा
प्रश्नोत्तर मणि माला
विनयपत्रिका
गीतावली
रोगान्तकसार
श्याम सखेकी पदावली
शृंगारसङ्ग्रह
कहानी की पुस्तक
चिट्ठियोंकी पुस्तक

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL

FOR APRIL, 1851.

The Society met on the 2nd instant at half-past 8 P. M.

The Hon'ble SIR JAMES COLVILE, President, in the Chair.

The proceedings of the meeting for the month of March were read and confirmed.

Bábu Jádavakrishna Siñha, duly proposed and seconded at the preceding meeting, was balloted for and elected an ordinary member.

The following gentlemen were named for ballot at the next meeting.

H. Woodrow, Esq. M. A.; proposed by the President and seconded by Mr. C. Beadon.

Joseph Fayrer, Esq. M. D.; proposed by Mr. Frith and seconded by the President.

Read letters—

1st. From Mauluvi Mohí-ud-din Ahmed, forwarding copies of the *Kholásat-ul-Hisáb* and *Tafsír Ahmadí*, for sale to the Society.

On the recommendation of Dr. Sprenger, it was determined that the last named work be purchased.

2nd. From E. A. Samuells, Esq., presenting on behalf of A. Spiers, Esq. C. S., the following coins to the Society.

3 Scotch coins of 1570—1582 and 1602.
1 of Sigismund III., king of Poland.
1 of the Free City of Hamburg, 1671.
1 of Charles the 1st (without date).

3rd. From Captain W. Sherwill, submitting a paper descriptive of a Colossal statue near Mandár in Rájmahál, and offering to the Society a History of the Rájmahál hills for publication in the Journal.

sources which may be accessible to me in Europe, and upon the assistance of the learned in India in finding out the most important ancient works. I venture to hope, if the interest for this branch of the development of the Hindus is resuscitated in accordance to a systematical plan, that we shall in course of time receive from India those appliances the want of which we feel now so keenly.

" Permit me to mention more specially for what the first is wanted. I have of course to commence with the Mímánsá, of which the study the more requires renovation, as this commentary to the Vedas is closely connected with another, which my friends M. Müller and A. Weber are now publishing. I have commenced with the publication of the *Jaiminíya-nyáya-málá-vistara by Mádhava*, partly because, in want of other appliances I was compelled to begin with it, partly because I wholly concur in Colebrooke's opinion, that among all Mímánsá works this is the most simple and therefore best fitted for the commencement of its study. By the appliances I have met with at Paris, London and Oxford (there are none at Berlin) I trust, I shall be able to prepare a critical text. To this would be joined in the first volume the *Jaimini-sútras*, for which I have procured sufficient material. The next volumes of the Mímánsá division are to contain the extensive *Sábara-bháshya* and the important *Vartikas of Kumárila-svámin* For the former I have three MSS., but on account of their great extent, I do not yet exactly know whether they will be safe guides through the whole detail of my labours. *For the Vártikas, however, the prospect is yet very unsatisfactory*, as in Europe, viz. in London and Oxford, there are only two MSS., and both of them quite incomplete. An edition of this important work will therefore depend upon the success of my solicitations in various quarters for getting MSS., and I hope you will allow me also to request your mediation of procuring for me a MS. of the *Vartikas* of *Kumárila* (12 Adhyáyas of 4 Pádas each, with the exception of the 3rd, 6th and 10th Adhyáyas each of which contains 8 Pádas.) It would also be very important, if commentaries previous to Sábara could be discovered, especially the work, the author of which (in accordance with the designation of his disciples " Prábhákaras") must have had the name of *Prabhákara* :— also Guru. Jaimini's Sútras among others make a special mention of Bádari, but I have not been fortunate enough to trace a work of an author of this name, and I shall feel much obliged, if you can give me information about him. Is there any *Tantrika* work and a commentary to it by Bhavadeva in India? And may I take the liberty of asking another question, are there commentaries on Sábara's commentary, and which? In this case also is the Mímánsá literature in the East India House, ill-furnished; for it contains only a small fragment of such a commentary by *Salikanátha*.

"The complete success of all these literary undertakings will of course depend upon the interest which learned institutions take in the publication of these works, as I can but little rely upon any assistance from booksellers.

"The publication of those works, the printing of which has not been commenced yet, will be interrupted for a time by a labour in which I have been lately engaged; for I have accepted of a proposal to prepare jointly with the venerable and revered Wilson a third edition of his Sanscrit dictionary. It is to contain an index to Pánini, all my philosophical and musical indices, and beside Wilson's materials, all that is available in the glossaries (Bopp, Johnson and Lassen, &c. &c.) and lastly, alterations in single points. To give more, is unfortunately not possible, as the book is for a long time out of print, and as it is first necessary, within two or three years to prepare a work, corresponding as much as possible to the present wants. The printing will commence after six or eight weeks.

"I conclude this long letter with a question, which I hope, you will not consider indiscreet, as it is a new request for the liberality of the Asiatic Society.

"Some of my friends have given me hopes, that the Asiatic Society would perhaps favour me with a copy of the Bibliotheca Indica, if I sent them in return a copy of the works which I am publishing. That this will be done on my part, I hope, I need not assure you, and I only add, that I should feel extremely indebted to the Society, if they could join my name to those who receive from the liberality of the Society those editions, so important and so rare in Europe."

The President gave notice of a motion for the next general meeting, that the council be authorised to expend, out of the Oriental Fund, a sum not exceeding Rs. 500, in getting such of the Persian, Arabic and Urdu MSS. as require to be newly bound, rebound, and also in getting such of them as require transcription, transcribed.

The President also read such of the new rules as had been amended in the course of the discussions at the special meetings, and on his proposal they were confirmed and ordered to be printed.

He also announced to the Society that one of their Members, Mr. B. H. Hodgson, has been elected a corresponding Member of the Academie des Inscriptions et belles lettres.

The Librarian and the Curator in the Geological Department having submitted their usual monthly reports the meeting adjourned.

Confirmed, May 7th, 1851.

J. Colvile.

Report of the Curator, Museum of Economic Geology.

GEOLOGY AND MINERALOGY.

Mr. J. Weaver has sent us a specimen of an Asbestiform Chlorite Schist from New Zealand. This rock is a soft Chlorite Schist which crumbles between the fingers but which on the fracture is decidedly fibrous, and in appearance might be taken for petrified wood.

From H. Torrens, Esq. C. S. we have received a small collection of 12 specimens of fossils and rocks from the Mootee Jhurna Falls, of which some will be additions to our cabinets. He has also sent us three baskets of coal from the same locality which I have referred to in the next section.

From Mr. Theobald, Junior, we have also a few select specimens of rocks of which some will add to our collections.

From Lt. Fell, I. N. commanding the H. C. Survey Brig Krishna, we have received a few specimens of calcareous rock and clay slate with imbedded shale and indurated lignite, with coal, from Diamond Island. These, though mere shore specimens, are of interest if they shew that the Arracan coal formations extend along the coast of Pegu towards Moulmein, though they may be mere detritus brought to this point by the varying currents, and washed up by the sea.

I have also put into the form of a paper for the Journal an account of a very interesting series of Calderite rocks, shewing the formation of this rock, as in the granites, by the gradual mixture and more perfect (apparent) semi-fusion of its constituent ingredients.

ECONOMIC GEOLOGY.

I have forwarded to Government, and have also put into the form of a paper for the Journal my detailed Report on the Deoghur copper ores and on the extraction of the silver from two of those which contain it by the beautiful Spanish amalgamation process. It is not therefore necessary farther to refer to them here than to say that I have completely demonstrated the practicability and efficiency of the process in India even at an unfavourable season of the year. I regret to add that we are even yet in spite of my best efforts deficient in supplies of ores from this very interesting locality !* Captain Sherwill having proceeded on duty, and Mr. Vincent from the

* It is worth noting here how remarkable an instance this is of the difficulties in collecting minerals in India. There are six classes of the ores containing silver and as yet I have been able to obtain only a scanty supply of two of them, sufficient to afford experiments of a pound weight only, when could I have obtained 20 or even 50 lbs. I would have worked that quantity ! Of the remaining four we have too little to attempt an amalgamation with them. We want on such an occasion a maund, and we obtain but an ounce or two of each sort ; not for want of zeal and good will, but simply from the difficulties of distance, roads, climate, jungle and the want of Europeans on the spot. And yet this is within 200 miles of Calcutta.

nature of his public duties being unwilling to meddle with the mine. I learn, however, that Mr. G. Barnes has obtained a pottah of the mine, and his brother, Mr. Charles Barnes, called at the Museum for information and advice, which I of course have given to the best of my ability; and I trust that before the rains some samples of the ores will be sent to England to ascertain their fair commercial value.

Captain Sherwill has also sent us from the bed of the Adji River not far from Deoghur, some new samples of copper ore, which are the common sulphuret of copper. He states these were found in the bed of a dry nullah by a gentleman of the survey service. At present we have no farther information of this locality, and this ore is the poorest kind of copper ore, but it is of importance that we should know as many of the localities in which copper exists as possible.

Captain Sherwill has also sent us from Afzulpoor a specimen of coal of which he says,—

"I send you a box of the coal and Pyrites from near Afzulpoor on the banks of the Adji Nullah, 16 miles north of the Ranigunge collieries; it is no new discovery but the specimens may be of interest to the Museum."

Specimen No. 1.	Red sandy soil, ...	3 feet.	
„ No. 2.	Grey clay with minute veins of carbonate of lime,	2.	1.
„ No. 3.	A loose, incoherent carbonaceous stratum, ...	1.	1.
„ No. 4.	Bituminous shale, ...	6.	0.
„ No. 5.	Bituminous coal with Pyrites; the depth of the coal unknown, ...	13.	6.

(Signed) W. S. Sherwill.

27th June, 1850, *Berhampore*.

As this coal was of a brighter appearance than any Burdwan coal which I have seen, I have analysed it and the result is that it contains in 100 parts—

Gaseous matter,.....	32.	25.
Carbon, ...	60.	15.
Grey ash, ...	7.	15.
Loss (Water?)		45.
	100.	00.

The pulverised coal cakes into a single puffy mass of fine coke, very porous and metallic in the fracture, and burning very slowly while reducing it to ash. The ash is of a whitish grey colour and contains minute granules of a white colour. It does not effervesce with Muriatic Acid and thus contains no Carbonate of lime. A lump of this coal burnt in a close crucible gave 71 per cent. of coke, and as this coke would contain the 7.15 of ash, 100 parts of the coke would thus contain 10.07 of ash—in round numbers 11

per cent. or 60 per cent. of pure coke. From its slow combustion it might not answer for steam purposes, but for smelting and other work it would no doubt suit. I find that this coal approaches within 1 per cent. of its constituents to the Chinakuri coal No. 6 analysed by Mr. James Prinsep in his table given at p. 197 of Vol. VII. of the Journal (1838) which gives 52 per cent. of pure coke, Newcastle coal giving 65 per cent. of coke.

Mr. Torrens' specimen of coal from the Mootee Jhurna Falls mentioned above was also examined.

It is a bright jet coal decomposing very rapidly in the air and separating into small parallelopipeds. It burns in the forceps with a steady glowing combustion leaving a white ash. It gives no visible smoke from the closed crucible but a sickly disagreeable smell.

The constituent parts are,

Water,*	18.	50.
Gaseous matter,.....	23.	75.
Carbon, ...	29.	30.
Ash,.....	28.	45.
	100.	00.

The ash is of a pale brown colour and like the foregoing contains minute little white granules. It also contains no lime as a carbonate.

We have also received from Major Jenkins two specimens of coal from Namsang Cabing and Barjan, in Assam. The last is labelled "Barjan Steam Coal" and some fine coke made from it has been sent down with it. From the pressure of other researches on hand, I have not been able yet to examine these specimens, but will do so on an early day. Major Jenkins has also forwarded a specimen of the supposed argentiferous lead ore from the Bhor Kamptee country, but upon examination it does not contain any appreciable quantity of silver. The following letters refer to this ore.

No. 118.

From the Under Secretary to the Government of Bengal,
To H. PIDDINGTON, *Esq. Curator of Economic Geology, dated Fort William, the 28th February,* 1851.

SIR,—The Agent to the Governor General, North East Frontier, having reported to Government that he has forwarded to you, by Dáwk banghy, a specimen of argentiferous lead found in Bor Kamptee in upper Assam, I am directed by the Deputy Governor of Bengal to request that you will submit

* By an independent experiment. It is probable that on being freshly mined it may not contain by a great deal so large a proportion of water the absorption of which, when it is exposed to the air, is probably the cause of its rapid decomposition which, with its large proportion of ash, wholly unfits it for a useful coal except on the spot.

a report of the result of any analysis of the ore in question which you may make, for the information of his Honor.

I have the honor to be, &c.

(Signed) W. SETON KARR,
Under Secretary to the Govt. of Bengal.

From H. PIDDINGTON, *Esq. Curator Museum Economic Geology.*
To W. SETON KARR, *Esq., Under Secretary to the Government of Bengal.*

SIR,—In reply to your letter No. 118 of the 28th ultimo, I have the honor to report that the specimen of lead ore forwarded by Major Jenkins contains no silver, or so minute a portion as not to be detected by examination of such small quantities, and certainly none to render it worth working. It contains 3 or 4 per cent. of Antimony.

2. I fear Major Jenkins has been imposed upon, for his specimen is nothing more than a rolled lump of common galena probably picked from some torrent, and certainly not one from any wrought vein or bed. From the dread which natives entertain of Europeans obtaining any knowledge of their mines you are doubtless, Sir, aware, that nothing is more common, especially with native chiefs of all ranks, than to give, purposely, worthless specimens analogous in appearance to those of any value; and their followers dare not act otherwise. A notable instance or two has occurred of this within my own knowledge, and particularly one with the late Major Ouseley, in which smelted copper was given as the produce, and a red iron ore which did not contain a particle of copper, as the ore from which it was obtained!

I have the honor to be, &c.

(Signed) H. PIDDINGTON,
Curator, Museum Economic Geology.

Calcutta, 11th March, 1851.

Messrs. Robinson and Balfour have sent to the Museum some specimens of Turquoises with the following letter.

No. 167 1.

H. PIDDINGTON, Esq.

DEAR SIR,—At the request of W. J. H. Money, Esq., C. S. we beg to send herewith a parcel brought by him from Captain Lindquist, P. and O. Company's Agent at Suez, containing Turquoises picked up on Mount Serebat.

Captain L. would be glad to be informed whether they are of any value.

Yours, &c.

(Signed) ROBINSON, BALFOUR & Co.

These gentlemen have been informed that the specimens sent are no farther of value than as indicating the probability of a vein of these stones,

which, if good, might be well worth working, since good specimens sell at high prices in eastern countries, where the stone is supposed to possess peculiar virtues and is therefore held in high estimation.

H. PIDDINGTON,
Curator, Museum Economic Geology.

LIBRARY.

The following books have been received into the Library during the month of March, 1851.

PRESENTED.

A Synopsis of the characters of the carboniferous Limestone Fossils of Ireland. By Mr. Frederick M'Coy. Dublin, 1846, 4to. PRESENTED BY RICHARD GRIFFITH, Esq.

A Synopsis of the Silurian Fossils of Ireland collected by R. Griffith, Esq.—By F. M'Coy, Esq. Dublin 1846, 4to.—BY THE SAME.

Astronomical observations made at the Observatory of Cambridge, by the Rev. James Challis. Vol. XVI. for the years 1844-5. Cambridge, 1850.—PRESENTED BY THE SYNDICATE OF THE CAMBRIDGE OBSERVATORY.

Selections from the Records of the Bengal Government. No I. on the Poppy Cultivation and the Benares Opium Agency. By Dr. W. C. B. Eatwell. Calcutta, 1851. Pamphlet.—BY THE GOVERNMENT OF BENGAL.

Tattwabodhiní Patriká. No. 91.—BY THE TATTWABODHINÍ SABHÁ.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the month of February, 1851.—BY THE DEPUTY SURVEYOR GENERAL.

Satyárṇaba, No. 9.—BY THE REV. J. LONG.

The Journal of the Indian Archipelago and Eastern Asia, for January, and February, 1851. Two copies each.—BY THE GOVERNMENT OF BENGAL.

List of Articles contributed from Bengal to the Great Exhibition of 1851.—BY DR. J. M'CLELLAND.

The Oriental Christian Spectator, February, 1851.—BY THE EDITOR.

The Calcutta Christian Observer, April, 1851.—BY THE EDITORS.

The Citizen, for March, 1851.—BY THE EDITOR.

Upadeshaka, No. 52.—BY THE EDITOR.

The Oriental Baptist, No. 52.—BY THE EDITOR.

The Purṇachandrodaya newspaper for March, 1851—BY THE EDITOR.

EXCHANGED.

Athenæum, Nos. 1208—12.

PURCHASED.

Layard's Nineveh, 2 vols. 8vo.

Humboldt's Cosmos. Translated by Otté, 2 vols.

Journal des Savants. Novembre, 1850.

The Annals and Magazine of Natural History, for December, 1850, and January, 1851.

The French in India.—BY LIEUT. LAURIE.

Comptes Rendus, Nos. 22 to 25, for Dec. 1850.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of April, 1851.

Date.	Observations made at Sun-rise.						Maximum Pressure observed at 9h. 50m.						Observations made at Apparent Noon.					
	Bar. red. to 32° F.	Temperature.			Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature.			Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature.			Wind.	Aspect of Sky.
		Of Mer.	Of Air.	W. Bulb.				Of Mer.	Of Air.	W. Bulb.				Of Mer.	Of Air.	W. Bulb.		
	Inches	°	°	°			Inches	°	°	°			Inches	°	°	°		
1	29.972	75.6	76.0	74.0	N. W.	Cloudy	30.041	81.6	83.1	76.8	W.	Cumulo-strati	29.998	86.6	88.4	77.2	W.N.W.	Cumulo-strati
2	.956	76.8	76.9	74.7	N. W.	Cumulo-strati	.012	83.2	86.1	76.2	S. S. W.	Clear	.977	89.0	90.7	74.9	S. W.	Clear
3	.892	76.8	76.8	75.2	S.	Clear	29.917	85.0	87.3	77.8	S. S. W.	Ditto	.873	91.0	92.9	77.6	S. W.	Cumuli
4	.793	77.6	77.5	75.5	S. S. W.	Ditto	.850	83.3	85.4	79.0	W.N.W.	Ditto	.796	90.2	92.4	77.9	S. W.	Clear
5	.745	80.0	80.3	78.3	S.	Cloudy	.800	85.4	88.0	80.7	S. W.	Ditto	.746	92.3	94.0	83.0	S.	Cumuli
6S.	.788	79.5	79.4	77.4	S.	Ditto	.838	86.0	88.2	79.7	S.W. sp.	Ditto	.817	91.2	92.8	82.5	S. sharp	Clear
7	.834	79.3	79.5	76.6	S.	Clear	.894	86.3	88.8	79.0	S. W.	Ditto	.862	91.3	92.4	81.4	S. S. W.	Ditto
8	.854	79.3	79.4	76.8	S.	Cloudy	.945	84.8	86.3	78.2	S. W.	Ditto	.910	90.6	91.2	80.3	S. W.	Cirro-strati
9	.866	79.8	80.0	77.8	S. S. W.	Cumuli	.917	86.3	88.4	77.3	W.N.W.	Cirro-strati	.882	92.4	94.4	77.2	S. W.	Ditto
10	.766	78.6	78.6	71.4	S.	Clear	.820	88.4	91.2	72.2	S. W.	Ditto	.761	95.6	97.4	77.0	S.	Ditto
11	.744	79.4	79.2	76.3	S. S. W.	Ditto	.794	86.7	89.2	78.2	S. W.	Clear	.746	94.6	96.5	78.0	S. E.	Clear
12	.673	81.2	81.7	79.9	S. S. W.	Cirro-strati	.742	87.7	90.2	79.8	S. W.	Ditto	.709	93.6	96.3	75.2	N. W.	Cirro-strati
13S.	.752	80.3	80.4	78.2	S.	Cirro-cumuli	.821	88.0	90.1	82.0	S.	Cumuli	.801	92.2	93.6	82.2	S.	Cumuli
14	.874	81.7	81.3	79.2	S.	Clear	.924	87.6	89.5	80.3	S.	Ditto	.886	92.4	94.3	82.0	S.	Ditto
15	.855	75.8	75.9	72.8	S. S. E.	Ditto	.904	86.2	88.9	81.0	S. S. W.	Ditto	.855	91.3	93.3	81.4	S. S. W.	Clear
16	.800	77.3	76.5	70.6	W.N.W.	Cirro-strati	.863	84.4	87.6	74.7	N. E.	Cirro-strati	.847	91.0	93.3	75.2	S. S. W.	Ditto
17	.807	80.0	79.8	78.2	S. E.	Ditto	.844	87.0	88.7	80.8	S.	Cumulo-strati	.810	90.2	92.0	82.0	S. S. W.	Cumulo-strati
18	.787	73.2	73.4	71.3	S. W.	Clear	.852	84.0	86.7	79.6	S.	Ditto	.819	89.0	89.8	81.2	S.	Ditto
19	.819	75.3	75.3	71.3	W.	Cloudy	.865	81.4	82.0	76.5	S. W.	Cloudy	.848	85.4	87.6	80.7	S. W.	Cirro-strati
20S.	.805	75.3	75.0	70.8	S.	Ditto	.854	83.2	85.4	78.0	W.	Cirro-cumuli	.821	88.2	89.0	89.4	W.	Cirro-cumuli
21	.763	77.6	77.0	70.8	W.N.W.	Ditto	.788	82.1	84.8	75.4	S. W.	Clear	.747	88.4	90.2	78.8	W.	Cirro-strati
22	.669	78.7	78.6	77.0	S.	Clear	.737	85.9	88.0	81.2	S.	Cumuli	.687	90.7	92.0	83.8	S.	Cumuli
23	.672	72.2	72.6	71.3	S. W.	Ditto	.705	83.0	85.0	80.5	S.	Cumulo-strati	.646	88.2	89.5	82.3	S.	Cumulo-strati
24	.634	79.2	79.6	76.6	S. S. E.	Cloudy	.676	83.6	86.2	82.6	S.	Ditto	.642	88.0	90.0	83.8	S. S. E.	Ditto
25	.696	79.2	79.0	77.7	E.	Ditto	.732	84.2	85.7	82.2	N. E.	Cloudy	.692	88.7	90.6	84.4	E. N. E.	Ditto
26	.642	81.3	81.0	80.0	S.	Clear	.677	87.6	89.3	81.4	S.	Cumuli	.636	90.4	90.8	82.4	S.	Cumuli
27S.	.603	81.2	81.4	79.3	S.	Cumuli	.655	89.3	90.5	81.3	s.s.w. sp.	Ditto	.664	91.0	92.2	82.3	s.s.w. sp.	Cumulo-strati
28	.689	80.8	80.8	78.8	S.	Ditto	.745	87.5	88.8	81.8	S.	Ditto	.720	91.0	92.2	81.4	S. sharp.	Clear
29	.691	80.8	80.8	78.4	S.	Cirro-strati	.734	88.0	89.8	81.4	S.	Clear	.706	91.1	92.7	80.3	S.	Ditto
30	.605	81.8	81.9	79.2	S. S. W.	Cumuli	.649	88.4	89.6	80.7	S.	Cumuli	.629	92.3	93.4	81.5	S. W.	Ditto
Mean	29.768	78.5	78.5	75.9	....	.....	29.821	85.5	87.6	79.2	....	.....	29.784	90.6	92.2	80.2	....	.....

[*Meteorological Register, continued.*]

Observations made at 2hs. 40m.						Minimum Pressure observed at 4 p. m.						Observations made at Sun-set.						Maximum and Minimum Thermometer.				Rain Gauges.		Moon's Phases	Date.
Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Max.	Mean.	Min.	Max. Therm. in Sun's rays.	Feet. 60. Upper.	Feet. 5. Lower.		
Inches	°	°	°			Inches	°	°	°			Inches	°	°	°			°	°	°	°	Inch.	Inch.		
29.907	91.6	92.6	76.4	N. W.	Cumulo-strati	29.884	92.3	92.3	73.6	S. W.	Cumuli	29.893	88.0	87.5	73.8	S. E.	Clear	93.0	84.4	75.8	116.3	..	..		1
.848	92.4	92.4	75.0	w.s.w.	Ditto	.824	92.4	92.7	75.5	S.SW.	Cumulo-strati	.835	87.8	86.0	72.0	S.	Ditto	93.8	85.6	77.3	110.8	..	..	●	2
.781	95.0	96.2	71.3	W.	Cumuli	.747	95.7	96.3	71.7	WSW	Clear	.735	90 4	87.7	77.4	S S W.	Ditto	96.4	86.7	77.0	112.6	..	..		3
.717	95.3	96.6	73.7	w.s.w.	Ditto	.695	96.2	95.8	77.7	S.	Ditto	.695	92.0	90.0	80 0	S.SW.	Ditto	97.3	87.6	77.8	117 0	..	..		4
.667	95.3	95.3	81.0	S.	Cumulo-strati	.641	95.4	95.4	80.2	S.	Ditto	.674	90.8	89 0	81.3	S.	Ditto	96 5	88.7	80.9	114.6	..	..		5
.746	93.8	93.0	79,0	S. shp.	Clear	.734	93.0	92.2	80.2	S.	Ditto	.761	88.4	87.4	79.8	S.	Cirro-strati	95.0	87.4	79.7	109.8	..	..		6
.785	93.4	92.8	82,5	S.	Ditto	.775	92.2	91.4	80.5	S.	Ditto	.779	89.0	87.7	80,0	S.	Ditto	95.2	87.5	79.8	109.7	..	..		7
.833	92.6	94.4	78.8	S. W.	Cirro-strati	.819	93.4	94,0	73.0	S. W.	Cirro-strati	.833	91.0	90.2	72.8	N.	Cumuli	94.6	87.3	80.0	113.8	..	..		8
.785	96.3	97.0	76.6	W.	Ditto	.765	96.6	96.9	75.8	S. W.	Ditto	.758	92.8	90.0	70,2	S.SW.	Cirro-strati	97.7	87.9	78.0	115.5	..	..		9
.691	97.5	97.4	81.2	S.	Ditto	.667	96.6	95.2	80.5	S.	Ditto	.664	91.0	89.4	77.3	S.SW.	Ditto	99.6	89.3	79.0	115.0	..	..	D	10
.679	97 4	98.6	75.4	E.	Clear	.662	98 0	98.3	75.3	S.	Clear	.651	94.5	93,0	82,4	S.SW.	Ditto	99.0	89.4	79.8	118.5	..	..		
.638	97.4	99.3	74.0	N. W.	Cirro-strati	.611	98.3	99.4	73.4	S. W.	Cirro-strati	.609	94.4	92.6	74.4	S.	Ditto	99.2	90.5	81.8	121.3	..	..		
.726	95 3	95.8	80.5	S.	Cumuli	.718	95.6	95.3	83.3	S.	Cumuli	.733	89.0	87.0	80,2	S. shp.	Cloudy to the S.	96.8	88.9	81.0	114.6	..	..		
.810	94.2	94 0	81.2	S.	Ditto	.763	93.6	92.6	81.2	S.	Clear	.763	89.2	86.9	79.8	S.	Cloudy	95.8	88.8	81.7	113.0	..	..		14
.776	94 0	94.2	82 2	SS.W.	Ditto	.747	93.4	93,0	82.0	S.	Cumuli	.748	90.0	88.0	80,8	S.	Ditto	95.4	85.6	75.7	112.3	..	..		15
.758	94.2	95.0	77.0	S.	Clear	.737	93.6	92.6	77.0	S.SW.	Clear	.764	88.6	86 4	78.2	S.	Cirro-strati	95.5	86.3	77.0	112.4	..	..	⊙	16
.718	93.2	93 5	82.4	S.	Cumulo-strati	.673	93.0	92.2	80.8	S.	Cumulo-strati	.674	87.6	86.0	79.2	S.	Cloudy	94.3	87.2	80.0	110.6	0.62	0.66		17
.734	90.7	90.4	80 5	S.	Cumuli	.723	90.4	90.2	80.3	S S W.	Cumuli	.749	87.5	86.8	79.6	S.S. E	Ditto	91.7	82.1	72.4	106.9	0.60	0.64		18
.782	89.4	88.2	82.0	S.	Cirro-cumuli	.761	89.6	89.4	82.5	S.S. E.	Ditto	.758	87.0	85.5	80.6	S.	Cirro-strati	91.4	82.8	74.2	109.7	1.04	1.10		19
.754	88.2	87.6	79.4	S.	Cloudy	.736	86.4	86.0	80.4	S.	Cloudy	.758	83.8	83.8	79.4	S.	Cloudy	90.2	81.6	73.0	101.0	..	..		20
.655	92.3	93.4	79.0	S S W	Cumuli	.609	93.0	93.2	81.2	S.	Cumulo-strati	.609	89.5	87.8	80.6	S.	Clear	94.3	85.9	77.5	115.8	..	..		21
.564	93.0	93.7	79.2	S. W.	Clear	.558	92,0	91,3	79 8	S.SW.	Cloudy	.687	76.8	73.7	72,2	ENE.	Raining	93.6	86.3	79.0	111.0	1.00	1.06		22
.576	90.6	91 6	85.0	S.	Cumulo-strati	.529	89.5	88.8	82.3	S.	Ditto	.567	85.0	84.8	80,3	S.	Cloudy	91.8	81.3	70.7	..	0.24	0.29	☾	23
.581	91.0	92.2	84.4	S.	Ditto	.564	91.3	91,0	84 4	S.	Cumulo-strati	.598	89.0	87.6	83,3	S. E.	Clear	92.7	84.4	76.0	109.8	..	..		24
.620	92.2	92.9	83.6	S.	Ditto	.595	92.5	92.0	83.4	S.	Ditto	.628	88.3	87.3	81.6	S.	Ditto	93.4	86.2	79.0	114.3	..	..		25
.575	92,6	93 2	83.4	S.	Cumuli	.550	92,0	91.0	82.1	S.	Cumuli	.562	88.8	87.3	80.7	S. E.	Cirro-strati	93.6	87.6	81.5	112.8	..	..		26
.601	92,3	92.7	83.4	ssr. sp.	Cumulo-strati	.586	91.8	91,2	82.3	S. shp.	Ditto	.626	88.8	87.4	81.3	S.	Cloudy	93.3	87.5	81.7	110.8	..	..		27
.648	94,0	94 2	82.5	S.	Clear	.601	93,0	92.5	80 3	S. shp.	Clear	.612	88.2	86.4	79,2	S.	Cirro-strati	94.8	88.1	81.4	112 8	..	..		28
.635	93,0	93.4	78.4	S. shp	Ditto	.597	93,2	92,8	78.8	S.	Ditto	.597	88.7	87.3	79.5	S.	Cloudy to W.	93.8	87.6	81.3	109.5	..	..		29
.579	94.4	94.3	82.1	S.	Cumuli	.547	93.7	93.3	81,8	S.	Cumuli	.563	89.7	87.9	79.3	S.	Ditto	95.4	88.8	82.2	109.7	..	..		30
29.706	93.4	93.9	79.7	....	.....	29.681	93.3	92 9	79.4	....	.....	29.696	88.9	87.3	78.5	....	.....	93.8	86.6	78.4	112.5	3.50	3.75		

CENTRAL LIBRARY

JOURNAL

OF THE

ASIATIC SOCIETY.

No. V.—1851.

Remarks on some lately-discovered Roman Gold Coins. By Capt. DRURY, *communicated by General* CULLEN, *H. C. Resident, Travancore, through the Hon'ble* W. ELLIOTT.

A most interesting discovery of a large quantity of Ancient Roman Gold Coins has lately been made in the neighbourhood of Cannanore on the Malabar Coast, not only remarkable for the numbers found (amounting to some hundreds) but also for their wonderful state of preservation. Many appear almost as fresh as on the day they were struck: the outline of the figures is so sharp and distinct, and the inscriptions so clear and legible. With very few exceptions they are all of gold, and of the age of Imperial Rome from Augustus downwards; several of them being coëval with the earliest days of the Christian era. From what we have been able to learn regarding their first appearance, it seems that a few were brought into the town of Calicut and offered for sale in the Bazaar by some poor natives who naturally supposing from their shining appearance that they were worth perhaps some trifle, gladly bartered them away for a day's feed of rice. The Coins however speedily found their way among those who were not long in estimating their real value, and the natives finding that some importance was attached to the glittering metal began to rise in their demands, and at length sold them for one, five, ten and subsequently for fourteen rupees the coin. The purity of the gold especially attracted the notice of the Jewellers and the wealthier natives,

who purchased them for the purpose of having them melted down for trinkets and ornaments—and many, it is to be regretted, have been irretrievably lost in this way. The secrecy at first so carefully maintained by the natives in respect to the spot whence they brought them rose in proportion to the eagerness with which the coins were bought up, and for a long time all endeavours proved fruitless in ascertaining the precise locality wherein they were found. It now appears that they were accidentally discovered in the search for gold dust by the gradual clearing away of the soil on the slope of a small hill in the neighbourhood of Kottayem, a village about ten miles to the eastward of Cannanore. A brass vessel was also found in which many of the coins were deposited. For a length of time the numbers appear to have been very great, and it has been stated that no less than five cooly loads of gold coins were dug out of the same spot. Neither will this startling assertion be so incredible after all, when we have it on record that upwards of five hundred coins were discovered in the Coimbatore district in 1842; a short but interesting account of which is given in the volume of the Madras Journal of Science and Literature, for 1844. Other discoveries have also been made at various intervals in the Deccan, the S. Mahratta country, Cuddapah, Nellore, Madura, and in various places in S. India. But in no instance has such a large quantity of coins almost exclusively gold been hitherto discovered, and all at the same time in such perfect preservation. It is impossible to make any correct calculation as to the numbers which have actually been found, but it might be mentioned that about eighty or ninety have come into the possession of His Highness the Rajah of Travancore—and still a greater quantity has been collected and preserved by General Cullen, Resident in Travancore, while even after the lapse of more than a year from their first discovery they are still procurable from the natives in the neighbourhood of Tellicherry and Calicut. The most numerous examples which occur are those of the reign of Tiberius, and next to that Emperor, those of Nero. It is not a little remarkable that both among these Aurei as well as among the Denarii alluded to as discovered at Coimbatore, 1842, the examples of coins of the Emperor Tiberius should in both instances have been more frequent than any other, although this may in some manner be accounted for when we consider that the reign of Tiberius extended

over a period of 23 years—a long time in comparison with that of the other Emperors excepting Augustus. In other respects the coins are of similar dates with an occasional difference of the types on the reverse of a few of them. No attempt appears hitherto to have been made to investigate if possible in what manner these relics of an age so long passed by, and of a people so interesting as the Romans from their distant conquests and foreign commerce, happened to be conveyed to these countries, where they are again brought to light after having been concealed for so many hundred years.

Before entering upon the subject of the earlier communication which the Romans had with India, a few words upon the history and progress of the later coinage of that people may not be altogether out of place while treating of a matter fraught with so much interest as the present.

Omitting purposely to say any thing about the coinage of the "Kingly period" it might be merely mentioned that the first gold coin that was struck at Rome was in the year 546 A. U. C. or about two hundred and six years before the birth of Christ—the silver coinage having been introduced about sixty years previously. In order to distinguish and separate more clearly the coins of the Republic from those of the Empire, the former have been termed "Consular" and the latter "Imperial" coins. Under the Empire the coinage both of gold and silver money was a privilege exclusively reserved for the Emperors themselves, and during the first Cæsars this was rigidly maintained, while to the senate was entrusted the superintendence of those of copper and other materials. The largest gold coins were called "Aurei," there being, besides these, coins of silver (Argentei), also brass and copper. The mint (Moneta) was a large building set apart for the purpose on the Capitoline hill, and it is a singular fact that the earliest coins of Rome were cast in a mould and not struck off in the customary manner. These moulds (formæ) were made of stone and some have been preserved to the present day. During the Republic the mint was under the superintendence of certain officers nominated for that purpose, but beyond this, very little is known regarding the internal management of that department. Every citizen, however, had the right of having his own money coined in the public mint and not only was there no reservation for the state for an exclusive coinage but there

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were provincial and colonial mints established in various parts of the Roman dominions. This system was however greatly modified under the Emperors and even those who were permitted to coin their own money were obliged to have the head of some Emperor or some member of his family stamped upon the coin and never their own images. Julius Cæsar was the first person whose actual portrait while living was stamped upon the public money and from his time the practice became general.

Thus it will be seen that the Romans had established a regular system for the coinage and necessary circulation of gold, silver and other monies as extensive as the bounds of the empire itself, and destined to carry this distinctive mark of wealth and civilization to the remotest limits of the known world.

We will now consider, in a brief and somewhat imperfect sketch, to what extent and in what manner the Roman trade first arose and was subsequently carried on with the countries of the East, and more especially with that part of India, to which we would more exclusively refer—the Malabar Coast: and also what degree of information the Romans actually possessed of this part of the country, and what kind of commodities were chiefly sought after for their luxury or use.

Previous to their conquest of Egypt the Romans derived the benefits of Eastern commerce indirectly from the merchants of that country, who under the reign of Alexander and the Ptolemies monopolized the entire trade of India and the adjacent countries. Besides this route, the articles of Indian produce and manufacture were imported into Europe by a longer and more tedious way than that of the Red sea. Being brought in vessels up the Persian Gulf and Euphrates, they were conveyed thence across land to Palmyra, then the grand Emporium of Eastern commerce, and which in its central position became an important place from its flourishing and prosperous trade. From Palmyra the goods were carried to the different ports of Syria, and thence distributed to the various countries bordering on the Mediterranean sea. At last the Romans, having subjected Greece and Syria to their sway, and overcome the Republic of Carthage, made a descent upon Egypt, which soon yielded to the force of their arms, and from this time that rich and celebrated country was transformed into a Roman province. This happened during the reign of Augustus, and about thirty years before the birth of Christ.

From this time we may conclude that all direct intercourse of the Romans with the East commenced. They followed up their victories with that characteristic energy for an increased trade, which they ever displayed after the subjection of a foreign people, and the glorious prospect of an undivided command of the Eastern trade added an unusual degree of vigor to their subsequent proceedings. All the luxuries of the known world had hitherto been poured with a ceaseless flow into the opulent markets of Rome, and the opening of a new channel for the speedier importation of the rare commodities of the East, then so little known, was hailed with delight by the luxurious inhabitants of the Imperial city.

Although the occupation of Egypt by the Romans offered them a far greater facility of communicating with India, yet their progress in this respect appears to have been slow and gradual, Augustus probably being more desirous of firmly establishing his authority in that country than of extending his views to the conquest of remoter lands. No expedition to the countries bordering on the Red sea appears to have been meditated till some seventy or eighty years after the Egyptian conquest. During all this time the trade had been carried on by Greek or Egyptian vessels. Without venturing far to sea the commanders of these ships, starting from the port of Berenice (which still retains its ancient name) were in the habit of creeping slowly along the Arabian coast up the Persian Gulf, and never perhaps reaching farther than the mouths of the Indus, till at last, a certain commander more venturesome than his predecessors, boldly pushed across the ocean, and favoured by the Monsoon, safely reached the port of Musiris on the Malabar coast.* This successful voyage was but the prelude to other more fortunate enterprises, and so rapid became the increase of communica-

* It is not exactly known where the present position of Musiris lies, or even of Barace, another port which was not far from it. Robertson adopting the opinion of Major Rennell is inclined to fix them both between the modern towns of Goa and Tellicherry relying on a remark of Pliny that "they were not far distant from Cottonara, a country where pepper is produced in great abundance." In this case Barace might be the present Barcoor, as generally supposed, and Musiris in all probability Mangalore. The author of the Periplus remarks that "at all seasons a number of country ships were to be found in the harbour of Musiris," an observation very applicable to that place.

tion, that not long afterwards a fleet of one hundred and twenty sail was annually wafted by the assistance of the Monsoon from the Red sea to the coast of Malabar, from which time a regular trade was established between the ports of Egypt and the Red sea, and those of the Western coast of India.

From the death of Augustus to the elevation of Trajan to the Imperial throne no important additions had been made to the limits of the empire, with the exception of Britain. Trajan soon began to entertain the idea of carrying the Roman arms to the East, and circumnavigating the coast of Arabia, vainly hoped at length to reach the shores of India: but the expedition was so far unsuccessful, and the death of that Emperor soon after taking place, the project was entirely abandoned by his successor Hadrian.

The attempt of Trajan, who died 117, A. D., was never repeated by his successors, nor does there appear to have been any fresh acquisition made to the knowledge hitherto obtained of the western part of India until the reign of Justinian, when owing to the increase of the silk trade, the rival power of the Persians sprang up; the empire was even then in its decline, and the traffic and consequently the dominion over these seas being successfully disputed by a maritime people, the Romans were soon compelled to share and finally to abandon the profits of their commercial dealings with India, which had hitherto been crowned with such advantage and success.

Even the information which the most celebrated writers of the first and second centuries had obtained of India was most inaccurate and imperfect, and Strabo, Ptolemy, Pliny and others equally acknowledge and regret the scanty materials which they possessed regarding the true position and places of the Indian continent. Yet Cape Comorin was even then celebrated for its pearl fisheries, and Ceylon, discovered under the reign of the Emperor Claudius, had already sent an embassy to Rome.* Indeed Arrian himself, who flourished in the second century after Christ, and who might have been expected to have thrown more light upon this subject than either his predecessors or contemporaries appears to dismiss the subject in a hasty and summary manner,

* Pliny gives us the name of the Ambassador (Rachias) who was sent on this occasion. Previous accounts of Ceylon, as found in the ancient writers, were entirely fabulous and devoid of any correct information whatever.

which goes far to prove that his knowledge of the countries beyond the Indus was extremely limited.*

It is most probable that the Romans never exerted themselves to penetrate to any great distance for the commodities they procured from the East, being contented to carry on their trade at those markets on the Malabar coast, which were easiest of access and sufficient for the purposes required. One or more ports such as Musiris or Barace were most likely the chosen spots to which were gathered the necessary products of the Indian countries from whatever side they were brought, and from thence they were shipped to Egypt and thence to the shores of Italy. Merchandize was also conveyed, and perhaps still more frequently than by sea, across the country, enriching several towns and cities on the route which became the Emporia of such commercial goods as were despatched from the Eastern to the Western coast.

Thus the modern town of Arambooly, called Arguropolis by the Greeks, was celebrated in those days for its extent and for the busy trade carried on there. Ptolemy also and Pliny mention Kotar or Nagercoil, under the names of Cottiara and Cottora Metropolis, while the Greek and Egyptian mariners being afraid of doubling Cape Comorin, used to find a safe anchorage for their vessels in the little harbours of Covalum and Colachull to the northern part of that Cape, and which were called in those days the former Colis or Colias and the latter Cojaci.†

The chief articles of export from India during the time of the occupation of Egypt by the Romans were spices of various kinds. Diamonds and other precious stones, ivory, pearls, silk, &c. the latter probably brought from China only. Cinnamon was perhaps more extensively imported from Arabia or the Eastern coast of Africa, in allusion to which a modern writer has remarked that the seaport of Aden,

* The passage in Arrian to which I allude is the following τὸ δὲ πρὸς νότου τε ἀνέμοι καὶ μεσημβρίης, καὶ αὐτὴ ἡ μεγάλη θάλασσα ἀπείργει τὴν Ἰνδῶν γῆν, καὶ τὰ πρὸς ἕω αὐτὴ ἡ θάλασσα ἀπείργει, a vague remark which shows that Arrian was not the author of the "Periplus Maris Erythræi" wherein the coast of India and especially the Western part of it, is so minutely described.—*Arriani Hist. Ind. Cap. II.*

† Robertson affirms on the authority of the author of the 'Periplus of the Erythrean sea,' that the inhabitants of the Coromandel coast traded in vessels of their own with those of the Malabar coast, a fact which may account for the discovery of coins on the Eastern side of the Continent.

was in those days used by the Romans as an entrepôt for the merchandize passing from India to Egypt. "That seaport was apparently the same place which Ptolemy named 'Arabiæ Emporium'* and the author of the Periplus tells us that a little before his time it was destroyed by the Romans. But it is to be presumed that the Romans followed up their victory by occupation, for the position assigned in the Periplus to Arabia Felix together with the principle that it is nature which chiefly determines the site of a great maritime Emporium proves that the place in question was no other than Aden, which in the fifth century was the Roman Emporium of the Indian trade." Pepper was entirely supplied from the Malabar coast, and large quantities were shipped every season for the markets at Rome, where it was esteemed one of the greatest luxuries of the day. When Alarie was besieging Rome in the fifth century and condescended to accept a ransom for the city, he expressly stipulated for the deliverance "of 3000 lbs. weight of pepper," so much value was attached to that commodity. All sorts of precious stones were eagerly sought after by the wealthier inhabitants, though it is singular that the Romans set a higher value on pearls than they did on diamonds. The former were procured as at the present day near Ceylon and Cape Comorin, and the mines at Sumbhalapura, in Bengal, are probably the same which yielded their treasures for the Roman merchants some twenty centuries ago. Lastly, ivory, ebony,† and a few commodities of minor importance completed the list of useful or luxurious articles which were transmitted from this country.

* Cooley on the Regio Cinnamonifera of the Ancients.

† Virgil says, India mittit ebur. But Africa must also have furnished ivory and perhaps in greater abundance, and again

Sola India nigrum
Fert Ebenum,

but it is a mistake of Virgil's to suppose that India alone produces ebony, for Æthiopia is famous for it according to both Pliny and Herodotus. Lucan says, it is an Egyptian plant:

Ebenus Mareotica vastos
Non operit postes, sed stat pro robore vili
Auxilium

Virgil followed Theophrastus who fell into the same error. Ἴδιον δὲ καὶ ἡ Ἐβένη τῆς Ἰνδικῆς χώρας.

From the above brief sketch of the communication which the Romans had with the Western coast of India, and the enumeration of the chief articles of commerce which attracted their merchants hither for the purposes of trade, we have little occasion to be surprised at the discovery of such coins as have from time to time been found in this country; the great difficulty lies in determining by whom and how they were actually brought here and how many centuries may have passed away since they were either lost or deposited in those spots whence they are now taken. The oldest coins in the present collection are those of Augustus and the latest those of Antoninus Pius, embracing a period of about one hundred and forty years. We must therefore conclude that they were all brought here subsequent to or during the reign of the last mentioned Emperor while the very remarkable state of preservation in which they exist would lead us to suppose that they had never been in extensive circulation or use previously. It can be no matter of surprise that no other memorials of those times are found upon this coast, such as buildings, &c, &c., for the ancients obtained no footing in the country, but merely came and returned with their ships laden with merchandize.*

In the absence of all direct testimony as to the probable fact of these coins having been conveyed here by the Romo-Egyptian traders, there is another supposition worthy of taking into consideration, whether they may not have been brought here by those Jewish refugees who emigrating from Palestine about the year 68, A. D. spread themselves over this part of the continent at that early period. That country was then a Roman province and consequently Roman money was there in circulation. At that time ten thousand Jews with their families came and settled on the coast of Malabar and dispersed themselves in various places chiefly on the sea-coast. Now supposing several emigrations of the kind to have succeeded each other and taken place during the third and fourth centuries, (Palestine did not cease to be a Roman province until the beginning of the seventh century,) it is not unlikely that these coins may have been brought by them, and either from suffering persecution or oppression at the hands of the natives they may have buried these treasures for greater security or concealment. But besides the

* Remains of Roman buildings as well as coins have been discovered in Ceylon. In one instance of the latter they were mostly of the age of Antoninus.

Jews the Nestorian Christians may have been instrumental in conveying foreign coins to these countries. In 485, A. D. they obtained a footing in Persia whence they spread into almost every country of the East. But I do not consider this theory entitled to so much consideration from the fact of the coins being found in greater number on or near to the sea-coast, on which account it would assuredly be more plausible to support the idea of their having been brought by the Romans from Egypt, or the Jews from Palestine, presuming the latter people in their emigration came either by the way of the Red sea or the Persian Gulf.*

But in whatever manner these coins originally found their way to this country, their discovery after the lapse of so many centuries cannot fail to awaken the interest of all who appreciate in whatsoever degree the curious relics of antiquity. The contemplation of the Rise and Decay of the Roman empire is of itself a pleasing and instructive occupation. Our feelings are excited with admiration and surprise when we reflect on its unparalleled extent and magnificence; how nation after nation was subdued by its powerful arms—how its vessels sought every known harbour in the world; how its brave and well-disciplined armies humbled the haughtier republics of Greece and Carthage; how Egypt, Syria, and Arabia fell in successive conquests to the superior valour of its soldiery, and how even those distant countries, where the ocean, or the dread of hostile barbarians, opposed the progress of their arms, afforded their products of use or luxury for the gratification of the Roman citizen. The "inhospitable shores" of Britain were sought for the more useful commodities of lead, tin, and even pearls, while every country of the East, including even China, was rifled of the more luxurious treasures of silk, spices, and precious stones.

That glorious empire is now dissolved, but we possess ample and abundant testimony of its wealth, its energy and magnificence in such

* Humphrey in his recent work on 'Ancient Coins,' remarks, "that it was possibly of a Denarius of Tiberius, the then reigning Emperor, concerning which, the question 'Whose image and superscription is this?'" was asked. Whether such was the case or not, there is no doubt but that the coins of that Emperor were in extensive circulation in Judea, both during the lifetime of our Saviour, and at a subsequent period—a consideration which will be duly weighed by those who would support the hypothesis of Roman coins having been brought here by the Jews in their emigrations from Palestine.

memorials as have escaped the wreck of time. To the elucidation of history, and the more remarkable events of those earlier ages, there can be few more valuable memorials than coins or medals. The very image of those great personages who acted such conspicuous parts in the Drama of History are here brought at once to the eye and it ought to form the study and desire of every one to preserve, if possible, such interesting records, which so faithfully illustrate the events and lives of persons long passed away. To us who are in so unexampled a position with respect to India, the discovery of any Roman relic here is a matter of no ordinary interest—more especially when we find in this country coins which commemorate the expedition of a Roman Emperor into Britain some seventeen centuries ago! Britain was styled "the inhospitable"—"the barbarous country" and one "divided from the rest of the World" and was eventually abandoned by the Emperor Honorius, 420, A. D. as a colony not worth retaining possession of.* Records which attest to such facts must possess a delightful interest for every one who reflects for one moment on the position of England at the present day and the fallen Roman empire. "If all our historians were lost" says Gibbon, "medals, inscriptions and other monuments would be sufficient to record the travels of Hadrian," and the same author elsewhere remarks, alluding to a virtuous action of Antoninus Pius, (one of whose coins is in the present collection) wherein he displays a remarkable instance of his regard for the welfare of Rome: "Without the help of medals and inscriptions we should be ignorant of this fact so honourable to the memory of Pius."

We should be more fortunate were we in possession of a greater mass of materials than those left us by the labours of the Greek and

* See the curious passage in Plutarch relating to Cæsar's expedition into Britain. "But his expedition into Britain discovered the most daring spirit of enterprize. For he was the first who entered the Western ocean with a fleet, and embarking his troops on the Atlantic, carried war into an island whose very existence was doubted. Some writers had represented it so incredibly large that others contested its being, and considered both the name and the thing as a fiction. Yet Cæsar attempted to conquer it, and to extend the Roman empire beyond the bounds of the habitable world. He sailed thither twice from the opposite coast in Gaul, and fought many battles, by which the Britons suffered more than the Romans gained; for there was nothing worth taking from a people who were so poor, and lived in so much wretchedness."—*Plut. Life of Cæsar. Lang. Trans.*

Roman Geographers in respect to this country and its former commercial transactions, but I cannot help thinking that the diligent research of the antiquarian scholar would be amply rewarded by a more close investigation of the subject of the connexion of the Romans with the countries of the East. The trade by Egypt and the Red sea was carried on with the nations of Europe until the discovery of the Cape of Good Hope by the Portuguese, for upwards of fifteen hundred years: —Egyptians, Romans, Greeks, Persians and Arabians all successfully enjoyed and participated in the benefits of that route for the purposes of traffic. At length the transport of goods became diverted to another channel by a more tedious but perhaps in many respects a more advantageous passage, and it is not unworthy of reflection to consider the probability of a return to the first and earliest passage by the Red sea—which would appear destined after nearly four centuries have elapsed, to be adopted once more as the line of communication between the distant countries of the East and the European world.

Translation of a native letter descriptive of the locality and first discovery of the Coins.

Tellicherry, December 16th, 1850.

"Agreeably to my last note, I now beg to furnish you with the information of the discovery of gold coins here. About three years ago certain Syrians residing at Keelaloor Dashom in Palashy Amsham of the Cotiacum talook were in the habit of collecting gold from the bed of the river Vaniencudavoo (by taking the sand and sifting it), which was between Keelaloor Dashom and Vengador. One day whilst they were engaged in digging the bed of the river a number of gold coins was found in a part where there was a mixture of sand and mud. These were lying buried in the ground but not in a vessel. A great quantity was taken but nobody knows how many. Some suppose that these might have been buried here in bags, which have been destroyed. At a distance of ten koles east of this, there is a garden belonging to a Maplay in which are situated a small shop and two houses belonging to some low caste people who always reside there. During the hot season there is water to a man's depth whilst in the Monsoon there is depth equal to four or five men. The stream runs through one side of the dry bed of the river, whilst the other is so filled up with sand

that it is like an island. Below this island on the other side there is another current resembling a small canal which is the place whence the coins are taken. Certain Maplamars of Curvoye Talook hearing of the discovery of gold at this canal proceeded thither and tried to collect some, and it is said, that they also got some coins. Although what these people got, is not so much as taken formerly by others, nobody knows what was the exact quantity. About the year 964,* it is supposed that certain Gentoo inhabitants of Coorg or Mysore, were in the habit of trading in these parts. This being the time of war some wealthy merchants might have from competent reasons cast their gold coins into the river. There is no story of a wealthy man having ever resided in any of the adjacent villages. Subjoined is a sketch of the locality which I think is not more than twenty-four miles from Tellicherry."

Description of the Coins.

Augustus born 63, B. C. died A. D. 14. Reigned 58 years.

1. *Obverse.* AVGVSTVS. DIVI. F. Head of Emperor.

Reverse. IMP. XIII. Two figures, one seated.

2. *Obv.* Head of Emperor. No Inscription.

Rev. CÆSAR AVGVS. Triumphal Quadriga.

3. *Obv.* AVGVSTVS. DIVI. F. Head of Emperor.

Rev. AVGVS. rest illegible. Equestrian figure galloping.

4. *Obv.* CÆSAR. AVGVSTVS. DIVI. F. PATER PATRIÆ. Head of Emperor.

Rev. AVGVSTI. F. COS. DESIG. PRINC. IVVENT. L. CÆSARIS.

Two figures of Caius and Lucius; standing between them are two shields on the ground.

The inscription on the reverse of this coin would run thus: *Caius et Lucius Cæsares Augusti filii Consules designati principes juventutis.* Caius and Lucius were the grandsons of Augustus upon whom was bestowed the title of *Principes juventutis*, and it was subsequently conferred upon the probable successor to the throne when he first entered public life. Tacitus explains this when he says "Nam genitos Agrippâ, Caium ac Lucium, in familiam Cæsarum induxerat; nec dum positâ puerili prætextâ, *Principes juventutis* appellri, destinari Consules," &c. &c. Tac. Ann. 1, 3. See also Suet. in Aug. Cap. 64 et seqq.

* Corresponding to our era 1788, A. D.

The origin of the designation 'Pater Patriæ' given to Augustus by universal consent is thus described by Suetonius, (in Aug. C. 58,) Valerius Messala leaving the Senate house said "bonum faustumque sit tibi, domuique tuæ, Cæsar Auguste, Senatus te consentiens cum populo Romano consalutat Patriæ Patrem."

Tiberius born 42, B. C. died 38, A. D. Reigned 23 years.

5. *Obv.* TI. CÆS. DIVI. AVG. F. AVGVSTVS. PONTIF. MAX. Head of Emperor.

Rev. Figure of Clemency. A spear in one hand, and olive branch in the other.

6. *Obv.* TI. CÆSAR. DIVI. AVG. F. AVGVSTVS. Head of Emperor.

Rev. DIVOS. AVGVST. DIVI. F.

Head of Emperor surmounted with a star. The star was used as a symbol of the protection of heaven.

Claudius born 10, B. C. died 54, A. D. Reigned 14 years.

7. *Obv.* DIVVS. CLAVDIVS. AVGVSTVS. Head of Emperor.

Rev. EX. S. C. A triumphal quadriga.

8. *Obv.* TI. CLAVD. CÆSAR. AVG. GERM. P. M. TRIB. POT. P. F. Head of Emperor.

Rev. AGRIPPINÆ. AVGVSTÆ. Head of Agrippina, representing a young female. In beautiful preservation.

The inscription on the obverse would run thus. "Tiberius, Claudius Cæsar, Augustus, Germanicus, Pontifex Maximus, Tribunitiæ potestate. Pater Patriæ." There were two celebrated persons bearing the name of Agrippina, one was niece of Tiberius and mother of Caligula. The other was mother of Nero. The image on this coin is that of the former.

9. *Obv.* TI. CLAVD. CÆSAR. AVG. P. M. TR. P. IV. Head of Emperor.

Rev. IM. rest illegible.

A bridge and figure seated.

May not this coin commemorate the building of the celebrated Claudian Aqueduct which bears the Emperor's name to this day and is yet in use at Rome, though partly in ruins?

10. *Obv.* TI. CLAVD. CÆSAR. AVG. P. M. TR. P. XI. IMP. P. P. COS. V. Head of Emperor.

Rev. S. P. Q. R. P. P. ob. C. S. the foregoing is enclosed in a wreath or garland.

This would run. "Tiberius, Claudius, Cæsar, Augustus, Pontifex Maximus, Tribunitiæ potestatis undecimo (anno) Imperator, Pater Patriæ, consulatûs quinto (anno). Senatus, populusque Romanus, Patri Patriæ ob cives servatos." The device of a civic crown is very frequently met with. This was usually bestowed upon those who had saved the life of a Roman citizen. The Senate in bestowing honours upon Augustus decreed that a civic crown should be hung from the top of his house, and this honour having been assumed by the later Emperors a crown of oak leaves with *ob cives servatos* in the centre is often found on the reverse of coins in those Imperial times.

11. *Obv.* TI. CLAVD. CÆSAR. AVG. GERM. P. M. T. R. P. Head of Emperor.

Rev. EX. S. C. ob. Cives Servatos. Enclosed in wreath as above.

Ex Senatus consulto began to be invariably used on coins in the reign of Augustus. A few Republican coins are found with the same initials.

12. *Obv.* TI. CLAVD. CÆSAR. AVG. P. M. TR. PVI. IMP. XI. Head of Emperor.

Rev. S. P. Q. R. P. P. ob. C. S. encircled with wreath.

13. *Obv.* TI. CLAVD. CÆSAR. AVG. P. M. TR. P. X. IMP. P. P. Head of Emperor.

Rev. PACI. AVGVSTÆ. Winged figure of Victory.

14. *Obv.* TI. CLAVD. CÆSAR. AVG. P. M. TR. P. Head of Emperor.

Rev. PRÆTOR RECEPT.

Emblem of Concord representing two figures joining hands.

15. *Obv.* TI. CLAVD. CÆSAR. AVG. P. M. TR. PVI. IMP. XI. Head of Emperor.

Rev. DE. BRITANNI.

Triumphal arch. Emperor mounted—with trophies.

A most interesting coin—representing the arch erected by a decree of the Senate to the Emperor Claudius on the final subjugation of Britain. It was in the year 43, A. D. that the Emperor Claudius sent over a large force to conquer the island, which he subsequently joined himself, Vespasian, afterwards Emperor, being his second in com-

mand. This triumphal arch no longer exists, and were it not for the representation of it on coins we should have remained in ignorance of its ever having been erected.

Caligula born A. D. 12, died A. D. 41. Reigned 3 years 10 months.

16. *Obv.* C. CÆSAR. AVG. GERM. P. M. TR. POT. Head of Emperor.

Rev. AGRIPPINÆ. MAT. C. CÆS. AVG. GER. M. Head of Agrippina. The name of Caligula never appears on his coins and Caius is always expressed by C. The above coin was struck in honour of his mother Agrippina.

17. *Obv.* C. CÆSAR. AVG. PON. M. TR. POT. III. COS. III. Head of Emperor.

Rev. GERMANICVS. CÆS. P. C. CÆS. AVG. GERM. Head of Germanicus.

A coin struck in honour of his father Germanicus.

Drusus born 38, B. C. died 8 B. C.

18. *Obv.* NERO. CLAVDIVS. DRVSVS. GERM. AVGVSTVS. IMP. Head of Drusus.

Rev. DE. GERMANI.

Triumphal arch—surmounted with equestrian figure commemorative of the victories of Drusus in Germany.

19. *Obv.* NERONI. CLAVDIO. DRVSO. GERM: COS. DESIGN. Head of the Young Drusus.

Rev. EQVESTER. ORDO. PRINCIPI. IVVENT.

Drusus was made Consul 9, B. C. The 'Ordo Equestris' established 123, B. C. Those who were admitted into the Equestrian order enjoyed several privileges apart from the rest of the citizens. Such as their distinction of seats in public assemblies, &c. &c.

Nero born A. D. 37, died A. D. 68. Reigned 14 years.

20. *Obv.* NERO. CÆSAR. AVG. IMP. Head of Emperor.

Rev. PONTIF. MAX. TR. POT..... IV. P. P. EX. S. C. Figure holding a spear.

21. *Obv.* NERO. CÆSAR. AVG. IMP. Head of Emperor.

Rev. PONTIF. MAX. TR. P. X. COS. IV. P. P. EX. S. C. Armed Warrior.

22. *Obv.* NERO. CÆSAR. AVG. IMP. Head of Emperor.

Rev. PONTIF. MAX. TR. POT. IV. P. P. EX. S. C. encircled in wreath.

23. *Obv.* NERO. CÆSAR. AVG. IMP. Head of Emperor.

Rev. PONTIF. MAX. TR. P. V. IV. COS. IV. P. P. EX. S. C. Armed Warrior.

24. *Obv.* NERONI. CLAVD. DIVI. F. CÆS. AVG. GERM. IMP. TR. POT. EX. S. C. encircled in wreath.

Rev. AGRIPP. AVG. DIVI. CLAVD. NERONIS. CÆS. MAT. rest illegible. Two heads, male and female.

25. *Obv.* ANTONIA. AVGVSTA. Head of Antonia.

Rev. SACERDOS. DIVI. AVGVSTI. Two torches in upright position.

Antonia, daughter of Marc Antony was born 38, B. C. and was married to Drusus Nero. The inscription on the reverse of this coin may allude to the custom of priestesses (Sacerdotes) or flamens being appointed after the deification of the Emperors to superintend their worship at Rome and elsewhere.

Antoninus Pius born A. D. 86, died A. D. 161. Reigned 23 years.

26. *Obv.* ANTONINVS. PIVS. AVG. GERM. Head of Emperor.

Rev. P. M. TR. P. XVIII. COS. IV. P. P. a temple.

This temple may perhaps bear some allusion to that decreed by the Senate to Antoninus' wife Faustina after her death.

Additional.

27. *Obv.* CÆSAR. AVGVSTVS. DIVI. F. PATER PATRIÆ. Head of Emperor.

Rev. TI. CÆSAR. AVG. F. TR. POT. XV. Triumphal Quadriga.

28. *Obv.* TI. CÆSAR. DIVI. AVG. F. AVGVSTVS. Head of Emperor.

Rev. IMP. VII. TR. POT. XVII. Triumphal Quadriga.

29. *Obv.* TI. CLAVD. CÆSAR. AVG. GERM. PM. Head of Emperor.

Rev. CONSTANTIÆ. AVGVSTÆ. Female figure seated.

On the Shou or Tibetan Stag, Cervus Affinis, mihi. (With two Plates.)* By B. H. Hodgson, *Esq.*

Since my imperfect accounts of the Shou were published in the Journal (Nos. 6 and 7 of 1850) abundant supplies of the spoils of the species exhibiting both sexes in various states of maturity have been received by Dr. Campbell through Chebú Lama, the Sikim Vakil; and, as Dr. Campbell has kindly placed these spoils at my disposal for examination, I now proceed to describe this magnificent Stag from unusually copious and adequate materials, the sculls and leg bones being attached to the majority of the specimens. I have now examined nine samples, including my own original one which was described in the Journal, No. 117 of 1841, where the scull and horns, deposited since in the British Museum, are delineated.

The Shou is from eight and a half to nine feet in length and from four and a half to five feet high at the shoulder. The head is twenty-two inches long, nine deep and seven and three quarters wide. The ears are eleven inches long. The tail, less the hair, is three to four inches. The fore leg, from mid flexure downwards, is eighteen inches; and the hind leg, nineteen inches and more. The fore hoof is four and half inches long, three and three-eighths wide, and three high. The hind hoof, four and one quarter inches long, three in width and the same in height or depth. The horns are five feet long, three to four in spread between the tips, and ten to eleven inches thick at base. The general form of the animal is full of grace and vigour; assimilated to that of the European Stag, but with greater strength of limbs and broader hoofs. The head is finely shaped with broad flat forehead a little depressed before the horns, a slightly arched chaffron and graceful termination forwards, not actually thickened, as I had supposed, though less attenuated than in Hippelaphus, Elaphoides and Axis, or the tropical Deer; and the mufle or nude extremity of the nose is decidedly smaller than in them, perhaps even more so than in the Stag of Europe. The suborbital sinus is likewise conspicuously smaller, in skin and in scull, than in the tropical Deer just cited, or in the Muntjacs, though not inferior in size to the same organ in our

* Dr. Campbell, Superintendent of Darjeeling has presented to the Society the horns and skin of a very fine specimen in beautiful preservation.—Ed.

Red Deer, I apprehend. In the feet there are no interdigital pores, before or behind; nor are there apparently any calcic tufts or glands; though in one sample a nudity appears on the os calcis which has somewhat the semblance of this latter organ.

The graceful and majestic horns are inserted on the summit of the frontals but much before the occipital crest, upon a moderate foot-stalk which reclines considerably and is surmounted by a moderate-sized burr. The horns have an ample sweep and curve, both spreading and reclining much, and then approximating more or less, and for the most part greatly so, towards their tips, thus forming large segments of circles.

They are usually a good deal embrowned and more or less rough or pearled on the surface; but frequently are pale in colour and nearly smooth. The beam reclines greatly at first in the manner of the Axines, but about the centre of length it ascends rapidly with a lunate sweep. There are, uniformly in all otherwise diverse specimens, two basal tines, one central, and one apical to each horn. The basal tines or snags are inserted proximately, but not in contact, on the external anteal face of the beam, and are directed forwards with the tips turned upwards; the lower ones leaning over the eyes, the upper, running nearly parallel, outside of them. The upper basal tine or bez of each horn is the larger of the two, nay, it is the largest of the whole, and that invariably.

The central tine is inserted rather more externally and rises somewhat more than the basal ones; but still this snag also may be said to have an antero-external insertion and a forward direction. In size it is always the least of the tines and its position is very near the centre of the horn's length. The upper tine has very little of forward direction or insertion but radiates from the beam sideways, so as to form a simply furcate summit to each horn; its insertion being lateral and external, and its direction ascendant with moderate divergency from the beam. This apical snag is in size always superior to the central snag and often to the lower brow snag, but generally is as large as the latter though never so large as the upper brow snag or bez. Relatively to the end of the beam it is usually very distinctly smaller, but not invariably so. The tail is very short, and the caudal disc remarkably small, but conspicuous from strong contrast of colours. The limbs are

sufficiently fine, though remarkable for strength, and they are terminated by hoofs yet more noticeable for their breadth. The false hoofs are well developed and obtusely conoid in shape. The pointed narrow ears have no striæ within, but are filled with soft hair abundantly—a peculiarity which we may, no doubt, refer, like the contracted nudity of the muzzle and of the larmiers, to the coldness of the animal's habitat.

The pelage is of two sorts, a very fine wool next the skin, and a harsh, quill-like, porrect hair; whereof the latter is inserted in the skin by a slender pedicle or neck and is elsewhere throughout compressed but not wavy. The pelage is abundant and pretty equable in length, the cervine mane being by no means conspicuous and being proper rather to the lower than upper surface of the neck. It is chiefly developed about the gullet and that part of the abdominal surface of the neck which is next the gullet. But there is more or less of mane also on the dorsal surface of the neck; the samples before me being those of the winter dress of the species. The longest cervical and gular hair is from five to six inches; that of the body generally is not above two to two and half inches.

The general colour is earthy brown more or less lutescent, the head and neck being concolorous with the back; but the flanks are conspicuously paled, and the belly as conspicuously darkened. There are no fixed marks on the head, even the dark patch below the gape being sometimes wanting, and the neck, though paler below than above, is not very noticeably so. But the paling of the flanks is as decidedly so as the nigrescence of the belly; the white and black forming a conspicuous contrast on those parts.

More or less of the albescence of the flanks is communicated to the abdominal surface of the neck, and very noticeably to the hinder margin of the buttocks which is whitened confluently with the small caudal disc. The limbs are paler than the back, darker than the flanks, and they have an earthy brown list down the their external and anterior aspect. The internal and prevalent colour of the pelage is purpurescent slaty of a more or less embrowned tinge; the colours above noted being, for the most part, only the superficial ones, though the albescent and nigrescent parts have the pelage *wholly* of a whitish or of black brown hue.

The little tail is white, like its disc, a darker mesial line dividing the latter along the culmenal line of the tail.

The lining of the ears is always white or whitish, and so sometimes are the orbits and lips, but not uniformly. Some of the pale hairs of the body exhibit curious dots of a dark colour at intervals in their length ; not rings but dots merely. The hoofs and muzzle are black, and the horns, pale brown or full brown.

The females are smaller than the males. Their teats are four. They are less maned than the males, and they lack the conspicuous nigrescence of the belly in the males ; their abdomen being whitish like most part of the inferior surface. The brown earthy colour of the upper surface is likewise paler in the females. I have above described the general and normal character of the horns ; but the ample assortment of specimens before me, whilst it stabilitates beyond question that character, affords several subordinate variations too valuable to be omitted, which are as follow.

Both the length and thickness of the horns in animals of the same or nearly the same age and size, differ very much ; as much almost as 2 to 1. Next may be noted that the spread of the horns is very diverse, being much greater in some than in others ; or rather perhaps I should say that the sideway curvature varies much, and, as it is more or less, so are the tips of the horns brought near together or kept wide apart. Thirdly, the upper brow or bez antler is apt to have its tip reverted downwards and backwards, instead of being turned normally upwards.

Fourthly, the distance of the two basal antlers from each other is liable to vary considerably, or from two inches to more than four. But, that the greater interval is abnormal is shown, as well by its existing only in one horn of the pair sometimes, as, and at all events, by not characterising the pair generally. These basal snags are never in contact at their bases but very seldom above two inches apart. Comparing the scull of this typical stag (Elaphus) with that of the devious tropical stags of Asia (or, to be more precise, Hippelaphus) we may remark, that in the former the face is longer and the head shorter ; that is, that the molar, intermaxillar, and nasal bones are as much longer as the frontal and parietal bones are shorter. We may secondly remark that in the former the nasals are somewhat arched

lengthwise, but not so in the latter; and, thirdly, that there is less compression of these bones in our animal than in Hippelaphus, or, to speak more generally, in the tropical Deer. A fourth conspicuous point of difference from Hippelaphus and the rest (including Stylocerus) is the greatly less development of the cavity for holding the larmier, to all which distinctions we may perhaps add the greater declination of the encephalon from the base of the horns to the occipital crest; and, lastly, the somewhat ampler width of the occipital plane.

I have no longer any doubt that the Shou is the same species as that described by me under the name of Affinis in the Journal, ten years back. I got that splendid sample in the Tarai; but it had, I now conclude, been carried there from the Himálaya or from Tibet. The Shou inhabits a wide extent of country in Tibet, but is rarely if ever found in Chúmbi, and not at all in the Juxtanivean districts of Bhútán, as priorly affirmed. Wherefore it cannot be classed as Himálayan as well as Tibetan. Capt. Cunningham assures me that the Stag of Cashmir is the same animal; but Mr. Gray and Dr. Falconer judge otherwise; and, as it now appears that the Shou is *not* found in any cis-Himálayan district, nor even in Chúmbi with its half Himálayan and half Tibetan climate, I think this identity very questionable, as also that with the Maral or Stag of Persia. But I am strongly inclined to the conjecture that the Stags of Mongolia, of Mantchuria, and of Southern Siberia, are all identical in species with the Shou; and I am almost satisfied that the Stag of Tibet is specifically the same with the Wapiti of North America, especially that of Canada or the Canadian variety, called often the North-western Stag. Besides the ample spoils of the Shou, I have now before me a Stag's horn from Ladâk which may possibly belong to this species, though, being that of a young animal, I cannot say. It is anomalous if appertaining to the Shou by the extreme remoteness from each other of the two basal tines, which in a horn of but 34 inches long is above 4 inches ($4\frac{1}{4}$), whilst the next snag above may be the central, or it may be the apical, one. Its position is about half way between the upper brow snag or bez and the tip of the horn with which it makes a very unequal fork, and it is about the size of the (supposed) bez, but is less than the brow snag. All three tines, moreover, have a less anteal and more laterally external insertion and more upward direction than in

the Shou. The Bhotiahs, who brought this horn, say it belonged to a very young animal, and that the species which is proper to Gnári or Western Tibet, is larger than the Shou.

This horn is figured herewith. (Plate ix). It as little agrees with Wallichii as with Shou, though borne by an animal of precisely the alleged age (3rd year) of the only sample extant of Wallichii. One of the six mature samples of the male Shou now before me agrees with this anomalous and immature horn, pretty nearly, in the great separation of the pair of basal antlers, so that we may perhaps have in this young Stag of Lâdak only an unusual specimen of a young Shou; and, should that prove to be the case, we might reasonably become more inclined to admit that no specific distinction between the Gyâna (Wallichii) and the Shou is maintainable. At present I think otherwise, and apprehend that the alleged identity of species between the Shou and Wallichii (as well as the Ladâk Stag now spoken of) is more than doubtful, and, at all events is neither demonstrated nor demonstrable from existing materials.*

Capt. Cunningham tells me that the Cashmir Stag has sometimes a double fork at the top of his horns, thus making that animal a twelve tiner or Bára-singha. The like is sometimes true of the Wapiti and is alleged to be so of the Shou, though the normal form in Wapiti is the same (I conceive) as in Shou, viz. a simply and singly forked summit. Relative to the manners and habitat of the Shou the following is the substance of my information.

The spoils sent in were procured in the beginning of February at Lingmú, which lies beyond the snows and a little south of Phâri, between it and Chúmbi. The species is said to be very generally spread over the wide extent of Tibet, particularly Utsáng and Khám. Of its existence in Gnári or Western Tibet my informants cannot speak so confidently, nor from personal knowledge, though they believe it to be found in that province also. Its existence on this side of the Himá-

* It may surprise those who hear so much inconsistency upon the species called Wallichii by Cuvier to learn that this species was established solely upon a native drawing, and that it neither has been nor can be further confirmed than by reference to a single pair of horns declaredly *not* exhibiting the character of the species, whether from old age or youth, as is diversely affirmed. Nat. Libr. III. 161, and Regne Animal of Griffith IV. 104.

laya, in Bhútán, or even in Chúmbi, is still more questionable, though priorly reported, so that it must be considered a Tibetan species only, and not a Himálayan also.

Open plains it avoids, frequenting districts more or less mountainous and provided with cover of trees. It is most common at the bases of the loftier ranges, and in summer, when pasture is scarce below and the snows are melted above, the Shou ascends to the immediate vicinity of the snows, and descends again in winter to the lower levels. It is shy and avoids the neighbourhood of villages or houses, but depredates by night upon the outlying crops of barley and wheat. The species is gregarious, but not very greatly so, though herds of forty to fifty are usual, and more commonly met with than much smaller numbers, such as six or eight or a dozen, except at night when the herds are said to break up into families of the latter amounts, which families collect again into the larger herds in the day time. When the animals migrate, or move from one district to another, their herds are always seen in fullest force. The rutting season is the autumn, and then the herds are broken up, and two or three grown males may be observed following and contending for each female, though she be for the most part appropriated by the strongest of those males which thus attach themselves to her. The breeding season is the spring, and one only is produced at a birth, in places carefully selected as favouring concealment.

The flesh is much esteemed for eating, and the skin and horns also are much prized for economic uses; the immature horns, whilst yet full of blood, being deemed so highly medicinal that they sell for their weight in silver; and the mature horns, ground to powder and taken with mint, being likewise in use by the physicians of Tibet in cases of cholera, vomiting and such like.

July, 1851.

On the earliest Biography of Mohammad. By Dr. A. Sprenger, *Secretary to the Asiatic Society of Bengal.*

In comparing the different accounts regarding Mohammad we find that all authors agree on certain points (more particularly on his military expeditions) not only in the sense but even in the expressions. These accounts must therefore be derived from one common source. It appears on further enquiry that this source is a work of Zohry, I have therefore collected passages bearing on this subject.

"Zohry said, The study of the military career of the prophet is conducive to the good of this world and of the world to come. Zohry was the first man who wrote a work on the Biography of the prophet. Some authors say, The first Biography of Mohammad written in the Islám is that of Zohry." These are the words of the author of the *Insán al'oyún*. They run in the original قال الزهري احمد الله تعالى في علم المغازي خير الدنيا والاخرة وهو اول من الف في السير قال بعضهم اول سيرة الفت في الاسلام سيرة الزهري In Ibn Sa'd the Secretary of Wáqidy, is the following passage regarding Zohry. "Çálih b. Kaysán relates, I met Zohry, and we were both students, and we said to each other, Let us write down the Sunnah (traditions which are precedents in law) of the prophet; and we agreed to do so, and wrote down what came from the prophet. Then Zohry said, Let us also write down what comes from the followers of the prophet, for it is equally Sunnah. I answered, No, it is not Sunnah, let us not write it down. Zohry wrote it down, and I did not write it down." اخبرنا صالح بن كيسان قال اجتمعت انا والزهري ونحن نطلب العلم فقلنا نكتب السنن قال فكتبنا ماجاء عن النبي صلى الله عليه وسلم قال ثم قال نكتب ما جاء عن الصحابة فانه سنة قال قلت انا ليس بسنة فلا نكتبه قال فكتب ولم اكتب Cálih b. Kaysán died shortly after A. H. 140. He is a great authority in the Biography of Mohammad and frequently quoted by Wáqidy and others.

Ibn Qotaybah says of Zohry "His name was Mohammad b. Moslim b. 'obayd Allah b. 'abd Allah b. Shahább b. 'abd Allah b. al-*Hárith* b. Zohrah b. Kiláb. His great grandfather 'abd Allah b. Shahább fought at Badr, on the side of the enemies of the prophet and he was one of those

men who agreed in the battle of Ohad, to kill the prophet if they were to see him, or they would die themselves. The men who thus united themselves were 'abd Allah b. Shaháb, Obay b. Khalaf, Ibn Qamyyah and 'otbah b. Aby Waqqáç. Zohry's father Moslim b. 'obayd Allah followed the standard of Ibn al-Zobayr. Zohry lived at the court of the Khalif 'abd al-Malik b. Marwán and of his son and successor, Hisham. Yazyd b. 'abd al-Malik gave him the appointment of Qadhy. He died in Ramadhán, A. H. 124." He was then 72 years old. He may therefore have begun his literary career about sixty years after the death of the prophet, when several of those men who had known him were still alive.

Notwithstanding the testimony of the author of the Insán al'oyún I doubt very much whether Zohry has written a history of the prophet in a connected form, excepting perhaps of his military expeditions, مغازي We find no such book mentioned even by ancient authors, such as Ibn Aby Ya'qúb Nadym or the Sayyid alnás, and comparing traditions quoted by different writers on the authority of Zohry, it appears that it frequently happens that what one author gives as two traditions is mentioned as one by another. I am, therefore, inclined to suppose that Zohry merely took memoranda of the traditions which he heard and encouraged his numerous pupils to do the same. This opinion seems to be confirmed by Nawawy (*Biogr. Dict.* p. 119). "Malik relates, Zohry one day told me a very long tradition, I requested him to repeat as much of it as he thought necessary, that I might impress it on my memory. He refused to repeat it, but when I requested him to write it, he put it to paper for me." In this manner it would appear traditions were at the time of Zohry preserved in writing, but it was left for the following generation to compile them in systematic works.

Besides Zohry two other early works on the Biography of Mohammad deserve mention and may possibly still be extant, viz. Abú Ma'shar and Músà Ibn 'oqbah. Of the latter I have not been able to find any account. It appears, however, from an isnád in Ibn Sa'd who died in A. H. 230, that he flourished early in the second or towards the end of the first century of the Hijrah, for this author did not know Ibn 'oqbah himself but he was instructed in his work by Ismá'yil b. 'abd Allah b. Aby Oways of Madynah, who had been instructed in

it by a nephew of Ibn 'oqbah whose name was Ismá'yil b. Ibrahym b. 'oqbah.

The same Ibn Sa'd had been instructed in Abú Ma'shar's work by al-*Ho*sayn b. Mo*h*ammad who had been instructed in it by the author. It would therefore appear that Abú Ma'shar flourished after Ibn 'oqbah. Abú Ma'shar is one of those from whom *T*abary has derived his history. Sayyid alnás had both the work of Ibn 'oqbah and of Abú Ma'shar. Ibn Qotaybah contains the following short notice of Abú Ma'shar "His name is Ziyád b. Kolayb. He belonged to the tribe of Malik b. Zayd-Monáh b. Tamym. Some say his name was Zayd b. Kolayb. He died during the administration of Yúsof b. 'omar of the 'iráq." Yúsof b. 'omar was governor of the 'iráq in A. H. 123. (See Abúlfeda I. p. 455.)

For an account of other early works on the History of Mo*h*ammad, I refer the reader to my Life of Mo*h*ammad, p. 62 *et seqq.*

Review of "A Lecture on the Sánkhya Philosophy, embracing the text of the Tattwa Samása," by Dr. J. R. Ballantyne. Mirzapore, 1850. By Dr. E. Rõer.

There does not exist even now, nearly thirty years after the publication of the first of Colebrooke's celebrated essays on Hindu philosophy (1823), a correct estimate of the merits of it among European philosophers; this, however, is not owing to any remissness on their part,—they show, on the contrary, a commendable spirit of patience and fairness in their researches on this subject,—but rather to the insufficiency of the materials upon which they founded their opinion. The means at their command were Colebrooke's essays, the Upanishads, the Bhagavadgítá and Iswara Krishṇa's Káriká with some of its commentaries. Colebrooke's essays are, for the scholar who is able to study the philosophical systems of the Hindus in their originals, invaluable; forming, as they do, the best introduction to their study by the wonted precision of his treatment; but for the philosopher they do not suffice, as they were not intended to show the systematical connexion of the principal notions occurring in them, but rather to give a succint account of their doctrines, without entering into a discussion of the reasons which led to them. Such works, as the Upanishads and the Bhagavadgítá conceal the philosophical thought under a symbolical and

poetical garb, and give therefore as much space to fancy as to strict research. The Bhagavadgítá especially is more an attempt to fuse the ideas of several systems into one, than the precise exposition of any of them. The Sánkhya Káriká, no doubt, is able to open a correct view into the system of the Sánkhya, and if it has not done so, we must take into account the difficulties of a first attempt to understand the intricacies of a metaphysical system, unconnected with the development of philosophy in Europe.

There are, however, already now many more materials, which might have led to a more complete insight into the peculiarities of Hindu philosophy, viz. the S'áriríka Sútras (the Sútras of the Védánta) the Sánkhya Sútras, the Nyáya Sútras, the Bháshaparich'héda, and the Védánta Sára, which works have been published a long time ago. But, with the exception of the Vedánta Sára, they remained inaccessible to European philosophers, as no translations of them had appeared. There exists, to our knowledge, no account, for instance, of the Sáriríka Sútras or the Sánkhyapravachana Sútras, independent of what Colebrooke has given in his essays.*

The first and indispensable condition to form a correct idea of Hindu philosophy, is a knowledge of the Sútras or aphorisms which are considered as the original expositions of the reputed founders of those systems, and which certainly are the first systematical expositions of it which are still extant. They consist in short sentences, generally containing the doctrines of the system together with the reasons for them, although they sometimes refute the tenets of other systems or the prejudices of common belief about certain topics. There is no want of systematical connexion between them; but the intermediate links of thought between one Sútra and another are often omitted, which gives them frequently an abrupt appearance, and it must therefore be borne in mind, that aphorism, which is the common rendering of Sútra, means here a short, concise sentence, but not an unconnected one.

* Of philosophical works which have been lately published in Calcutta, we may mention: 1. The Tattwakaumudí, by Sriváchaspati Mis'ra (this is a commentary to Íwara Krishṇa's Kárika). 2. The Paribháshá, by Dharmaráj ádhwaríndra. 3. The Panchadási by Vidyáraṇyaswami, with commentary by Rámakrisht'a. 4. The S'abdas'aktiprakás'iká by Srijagadwis'a Tarkálankara Bhaṭṭáchárya. 5. Kusumánjali by Srimadudayanáchárya with a commentary by Haridása Bhaṭṭáchárya.

The high antiquity, ascribed to the Sútras by the commentators, who refer them to the inspired sages of the mythological era, may justly be questioned. They are acquainted with the other systems, sometimes quote each other, and refer to previous or later works. Hence we are compelled to conclude, either that the Sútras are not those of the reputed founders, or that they sprung all up at the same time, and that their founders made several additions to them, embodying in them the references to other systems. This is an absurdity which cannot be admitted by any one who is acquainted with the gradual development of any science.* At any rate, the Sútras in their present form are not the original expositions of the founders of those systems, but the revisions of a later time, perhaps of different ages, and there is no means to recover the Sútras in their original form. Nor is it possible to ascertain by the sole evidence of the Sútras of the several schools, which of them are more ancient than the others, for the reason above adduced, that they presuppose an acquaintance with each other.

The Sútras of all the systems are posterior to Buddha, as they dispute against the tenets of the different philosophical schools of the Bauddhas, the final revision of which was made in the collection, known by the name of Abhidhárma, at the third Buddhist synod, 246 B. C.† It is therefore most probable that none of the collections of Sútras in their present form existed before 300 B. C.

In this admission, however, it is not included, that the commencement of those systems does not reach to a much higher antiquity; on the contrary, it appears reasonable to suppose, that at least the Védánta, the Sánkhya, and probably also the Yoga systems existed anterior to Buddha.

* Or he must, like the Hindu commentators, ascribe to the founders an intuitive knowledge of the future; but this would be also of no avail, since the Sútras furnish no evidence, that they are composed by their reputed founders.

† Lassen's "Indische Alterthumskunde." Vol. II. p. 259.

"All of them (the founders of philosophical systems among the Buddhists) are, in fact, mentioned as cotemporaries of their master, which, however, cannot be true with regard to two of them. It must, therefore, be admitted, that in the collection, bearing the name of Abhidharma, works of different ages were comprehended, although all must have existed previously to the time of the third synod." (246 B. C.)

First, we find in the Upanishads the seeds of these three systems. The Sánkhya and Védánta are the theoretical expositions of the doctrine contained in the Upanishads. The Védantá system, especially, in its essential parts, is already met with in those works, which are only distinguished from the compositions of a later time by a less strict arrangement and method. And already at the time of the composition of the Upanishads the science of Brahma or the supreme being, had been taught by a succession of teachers; and although the form in which it was represented, was not that of a regular system, yet all the materials for it were present, and it did not require any great effort or a further development to give a methodical form to those doctrines.

These general considerations are confirmed by historical data. In the Mahábhárata the Védánta is mentioned as a distinct system;* in Manu also a certain doctrine is denoted by this name, and Manu is, in all probability, more ancient than the Buddhist era.† It appears, therefore, right to assume, that the doctrine of Brahma as the absolute substance, the source of all creation, was produced previous to Buddha.

The Sánkhya also must have preceded his period. It is evidently the philosophical theory of the author of Manu, as we find therein for instance the name of Avyakta for the creative principle, the name of Mahat (the great one) for its first production (intellect), which terms in this sense are only used by the Sánkhya.‡

Further the Sánkhya appears to have been the foundation of Buddhism by its assuming knowledge alone as the cause of liberation from pain, by its tenet of the three qualities (goodness, passion and darkness) as constituting the real being of nature, and by a resemblance of opinion in many minor points which this is not the place to state.§

* M. B. xii. 312, III. p. 771. This quotation I owe to Lassen, I. A. Vol. I. p. 834.

† L. I. A. Vol. I. p. 800. "As S'iva is mentioned in the most ancient Buddhist Sútras, but not yet in Manu, where, of the three great gods, Brahmá alone is mentioned, we may assume Manu's Code to have existed in the age before Buddha."

‡ Vid. Manu. S. 1st. Adh. 7 and 15.

§ L. I. A. Vol. I. p. 530. "Buddha's doctrine is an amplification and realization of the Sánkhya. Kapila rejected the merit of the pious works prescribed by the

From all this it appears evident, that at least two of the Hindu systems preceded Buddha, and we shall probably be nearly correct, if we assign their commencement to the century before him. Of the Sútras we found it probable, that they were composed within the last three centuries B. C. although some parts may afterwards have been added to them. The speculative genius of the Hindus would accordingly be enclosed within a period of about 600 or 700 years. After the time of the Sútras there was not made any great progress in philosophical thinking. The commentaries on them commenced about the fifth century A. D. Hence the development of the systems is clear. Some of the commentaries changed the system itself which they professed to expound. There were different explanations of the same doctrine, by which the doctrine itself became modified, and it is for the history of philosophy to show the differences of conception in one and the same school.*

If we now turn our attention to the Sútras of the Sánkhya, we find a double set of them, either ascribed to Kapila, the one known by the name of Sánkhya Pravachana Sútra, which was published in 1821, at Serampore, together with a commentary of Vijnánáchánya.† Colebrooke

Védas, and taught, that absolute liberation from transmigration was only possible by knowledge. Buddha taught the liberation from the infinite succession of births by the nirvána (extinction of existence.) A sign of it is infinite knowledge. An essential element of the Sánkhya, the doctrine of the three qualities, is also anterior to Buddha, as it is not only found in Manu, but is also mentioned in the last chapter of the Nirukta." (Manu S. 12, 24, Nir. 14, 3.)

* There originated for instance a difference in the Védánta, as the modern Védántists introduced the Máya, or illusive power, by which the whole creation turns out to be only an illusion, which notion took its rise evidently from the attempt to account for the variety of phenomena, independent of the one eternal and identical substance,—further the amalgamation of the Nyáya and the Vais'éshika systems, or rather the adoption of the latter by the former with some modifications which belong rather to detail than to difference of view; for the Nyáya Sútras do not give a metaphysical system of their own; they contain nothing else but logic with an appendix, showing the mode of conducting a scientific dispute,—further in all the schools modifications of some parts of the doctrine, and a more comprehensive and exact deduction of their tenets.

† The full title is: Kapiláchárya praṇítádhyátma vidyá pratipádaka Sútrasamúhátmaka Sánkhyapravachanaṇámaka grantha: Tadbháshyam Vijnáráchárya virachitam.

made ample use of them in his essay "On the Sánkhya philosophy." Of the other, bearing the title: "Sánkhya Tattwa Samása Sútra," Colebrooke was not aware whether it still existed or not, and this is the same work which has been published by Dr. Ballantyne. The former, which is a full exposition of the system, consists of six chapters or lectures, the latter is a very compendious treatise and does not occupy more space than a page. Colebrooke thought, that this collection was probably the original text, because the Sánkhya Pravachana contained many repetitions;* but he had not the Tattwa Samása before him, or he might have altered his opinion. The Tattwa Samása is apparently not the original; for it is not given in the usual form of Sútras,—viz. of concise sentences, which, however, give always the reason for what they assume,—but the whole is comprised in one sentence, containing only the names of the principal notions or divisions of the system, and appears to have been composed merely for the sake of calling to memory the topics treated in the more extensive Sútras.

The Sánkhya Pravachana is ascribed to Kapila, the founder of the Sánkhya; but this is impossible, the Sánkhya being more ancient than Buddhism, and the Sútras belonging to a much more recent time. This is evident from the Sútras themselves; for they quote the opinion of Panchas'ikha (Sánkhya P. S. p. 216, Cap. 6. S. 68) who is the disciple of Kapila's disciple Átri, and refer also to other teachers (l. c. p. 205). The Sútras further refer to the tenets of four of the Buddhist

* Col. M. E. Vol. I. p. 231. "It appears from the preface of the Kapilabháshya, that a more compendious tract, in the same form of Sútras or aphorisms, bears the title of Tattwa-samása, and is ascribed to the same author, Kapila. The scholiast intimates that both are of equal authority, and in no respect discordant: one being a summary of the greater work, or else this an amplification of the conciser one. The latter was probably the case; for there is much repetition in the Sánkhya Pravachana." And he gives afterwards (p. 232) as another reason the authority of the commentator: "If the authority of the scholiast may be trusted, the Tattwa-samása is the proper text of the Sánkhya, and its doctrine is more fully, but separately set forth, by the two ampler treatises, entitled Sánkhya Pravachana, which contain a fuller exposition of what had been succinctly delivered;" but this is a misapprehension; the scholiast does only say: "they are of equal authority, one being a summary of the greater work, or else this an amplification of the conciser one." Vid. Sánkhya Pr. Bhá. p. 5.

sects (for instance, 1st Adh. Sú. 20 to 40), which, according to the above mentioned reasons, would bring their composition down to the third century B. C. Moreover, Páṭaliputtra is referred to therein. This was, according to Lassen, built by the king Ajátas'atru a short time before the death of Buddha, and it became the royal residence of Asoka, who is named Kálásoka, 100 years after Buddha's Nirváṇa (about 440 B. C.) It was in ruins, when Hiuan Tshang visited India (A. D. 632).* The Sánkhya Pravachana, although not named, is also referred to by Íswara Krisht'a, in his Kárikáṭ which was commented on by Gauḍapada, the teacher of Govinda, whose disciple S'ankaráchárya lived probably at the close of the eighth century, so that Íswara Krishṭa must have lived latest at the beginning of the eighth or at the close of the seventh century, and the latest date of the Sánkhya Pravachana is therefore the seventh century. Hence it is evident, that the composition of this work falls within the space between 250 B. C. and 600 A. C.

The period, in which we have included those Sútras, is certainly very long; but limited as this determination is, it prevents a number of serious errors in our view of the development of Hindu philosophy. All further information we must expect from the publication of other works, especially of Patanjali's commentary to the grammar of Páṇini.

With regard to the second set of Sútras, the Sánkhya Tattwa Samása, we are left quite in the dark, as there are no materials to decide its

* Lassen I. A. Vol. II. p. 81. "Ajátas'atru appears to have long time had the intention of conquering Vaisáli; for it is recorded, that his two ministers Sunítha and Vásyakára founded in the village Páṭali, a fortress against the Vrigi; this took place a short time before the death of Buddha. It is, no doubt, the place, where the town Páṭali-puttra, afterwards so famous, arose; its situation is distinctly defined by the circumstance, that Buddha on his tour from Nálanda to Vaisháli came to that place." l. c. p. 84. "Kálásoka transferred his residence to Páṭaliputtra."

† Col. M. E. Vol. I. p. 233. "The author (Íswara Krishṭa) must have had before him the same collection of Sútras, or one similarly arranged. His scholiast (Náráyaṇa Tírtha) expressly refers to the number of the chapters." Wils. Sánkhya K. p. 192. "The Káriká must consequently (because in the 72d Káriká the author says, that he treats of the whole science, exclusive of the illustrative tales, and omitting controversional questions) refer to the collection of Kapila's aphorisms, called Sánkhya Pravachana" (the 4th and 5th chapter of which contain such tales and questions.)

date. It is not referred to in the Káriká or in Gaudapada's commentary. It is noticed, indeed, in Vijnanácharyá's Bháshya in the manner above stated; but this work is much later than Gaudapada. Who is the author of its (the Sánkhya Tattwa Samása) commentary, bearing the title "Tattwasamásasútravritti, we do not learn from the commentary itself, as the author has not named himself at the end of it, as is usually the case. There is, however, an interesting notice on the Tattwasamásasútras and its Vritti in a commentary of the Káriká, entitled "Sánkhyatattwavilása," by Raghunátha Tarkavágís'a Bhaṭṭáchárya,* where at its commencement the traditional belief is given as to the origin of this collection of Sútras, and of the author of the commentary of them, together with the Sútras themselves, and a short explanation of them. We think this tradition very curious, and do therefore not hesitate to transcribe the whole passage relating to the traditional account of the school.†

* This work was not known to Colebrooke; at least it is not mentioned by him in his essay. A MS. of it is in the Library of the Asiatic Society.

† पुरा किल कपिलशिष्य आसुरिनामा कश्चिद्ब्राह्मणः आध्यात्मिकाधिभौतिकाधिदैविकात्मिकत्रिविधदुःखैरनुभूतः साङ्ख्याचार्य्यं कपिलमहर्षिं शरणमुपेत्यात्मनो नामगोत्राद्यभिधायाह। भगवन् कपिलमहर्षे किमिह याथातथ्यं किं ज्ञात्वा कृतकृत्यः स्यामिति ॥ ततः कपिल उवाच। कथयामि। १ अष्टौप्रकृतयः। २ षोडश विकाराः। ३ पुरुषः। ४ त्रैगुण्यं। ५ सञ्चरः। ६ प्रतिसञ्चरः। ७ अध्यात्मं। ८ अधिभूतं। ९ अधिदैवतञ्च। १० पञ्च बुद्धयः। ११ पञ्च कर्म्मयोनयः। १२ पञ्च वायवः। १३ पञ्च कर्म्मात्मानः। १४ पञ्च पर्व्वाविद्या। १५ अष्टाविंशतिधाऽशक्तिः। १६ नवधा तुष्टिः। १७ अष्टधा सिद्धिः। १८ दशधा मूलिकार्थाः। १९ अनुग्रहसर्गः। २० चतुर्दशविधो भूतसर्गः। २१ त्रिविधो धातुसर्गः। २२ त्रिविधो बन्धः। २३ त्रिविधो मोक्षः। २४ त्रिविधं प्रमाणं। २५ त्रिविधं दुःखं। एतत्परं याथातथ्यं। एतत्सम्यक् ज्ञात्वा कृतकृत्यः स्यात्। न पुनस्त्रिविधेन दुःखेनाभिभूयते इति। एतान्येव साङ्ख्यसूत्राणि कुर्व्वन् कपिलः स्वशिष्यमासुरिनामानं मुनिमबोधयत्। आसुरिस्तु पञ्चविंशतितत्त्वेषु ज्ञानेन ज्ञानमाप्तवान्। आदिष्टो नमस्तस्मै कपिलाय महर्षये। इति पद्येन गुरुं नमस्कृत्य। यथातत्त्वसाङ्ख्यसूत्राणि व्याख्यास्याम इति प्रतिज्ञाय कश्चिद्ब्राह्मण इत्यनेन स्वनामाकथनात् स्वस्य विनयमाविष्कुर्व्वन् यथादृष्टं दृष्टान्तमभिधाय कपिल उवाचेति निर्द्दिश्य कपिलोक्तसूत्राण्याविष्कृत्य तत्र प्रथमं प्रकृतय उच्यन्ते इत्यधिकृत्य साङ्ख्यसूत्रवृत्तिं निर्म्माय स्वशिष्यं पञ्चशिखनामानमध्यापयाम्बभूव। एतदुक्तं सप्ततितमकारिकायां। एतत्पवित्रमग्र्यं मुनिरासुरयेऽनुकम्पया प्रददौ। आसुरिरपि पञ्चशिखाय तेन च बहुधा कृतं तन्त्रं। अथ तदृच्छया-

From this there appears no doubt, that the commentary is one of the oldest works of the school, as it is ascribed there to Ásuri, the disciple of Kapila. This statement, however, is disapproved by the commentary itself, where, among the earliest teachers of the Sánkhya, Ásuri and his disciple Panchas'ikha are enumerated. At any

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कदम्बं योर्ईश्वरकृष्णःखनामकसूचाणोत्यर्थः । अत एव षड्व्यापञ्चविंशति द्वासप्तत्या कारिकाभिः प्रवक्ष्येति पूर्व्वदत्तात्तः ॥

In olden times a certain Brámhaṇa, the disciple of Kapila, Ásuri by name, overwhelmed by the three kinds of pain, (viz. the pain arising from one's own nature, mental or bodily, from external animated agents, and from external inanimate agencies) took refuge with the great Rishi Kapila, the teacher of the Sánkhya, and having told him his name and race, he said: O venerable, great Rishi, Kapila, what is truth in this world, and what must I do to obtain the object of life? To this Kapila replied: I will tell you. 1. Eight producers, 2. Sixteen productions, 3. The soul, 4. The three qualities, 5. Evolution, 6. Revolution, 7. The ministers of the soul, 8. The province of organs, 9. The superintending deities, 10. The five modifications of intellect, 11. The five sources of action, 12. The five vital airs, 13. The five, whose nature is action, 14. The five-fold ignorance, 15. Disability of twenty-eight kinds, 16. Acquiescence of nine kinds, 17. Perfection of eight kinds, 18. The radical facts of ten kinds, 19. Benevolent creation, 20. Created existences of fourteen kinds, 21. Parental creation of three kinds, 22. Bondage of three kinds, 23. Liberation of three kinds, 24. Proof of three kinds, 25. Pain of three kinds,—this is the truth supreme. Having thoroughly understood this, a person will obtain the object of life, and not be subject again to the three kinds of pain. Kapila, having composed those Sútras of the Sánkhya, thus instructed his disciple, Ásuri by name. Ásuri then saluted his teacher with the following verse: "Salutation to the great Rishi Kapila, who obtained at the first creation the knowledge of the 25 principles by his birth," and having promised: "Now we shall explain" the aphorisms of the Sánkhya with regard to the principles, commenced in this manner: "A certain Bráhmana." By not telling in this manner his name, he was desirous of showing his humility, and having given the account according to truth, and told, that: "Kapila replied," he set forth the aphorisms, declared by Kapila, in the first of which the "Producers" are named. Having in this manner engaged himself, he composed a commentary to the aphorisms of the Sánkhya, and instructed his disciple Panchas'ikha by name. It is said in the Káriká in the 70th Sloka: "This great purifying (doctrine) the sage compassionately imparted to Ásuri, Ásuri taught it to Panchas'ikha, by whom it was extensively propagated." The Sútras, under the name of Iswara Krishṇa give the sense of this commentary. Therefore he explained the 25 principles of the Sánkhya by 72 Káriкas. Thus goes the ancient account.

rate, it cannot have been composed earlier than at the end of the second century B. C., as Patanjali, who, according to Lassen, lived in the time from 200 to 150 B. C., is at the same place mentioned as a teacher of the Sánkhya, with others after him, whose names are not stated.*

From the preceding remarks the importance of the Sútras is evident. An acquaintance with them saves a number of useless speculations, and gives the only hold we can make use of in an historical research by referring any later exposition of a system to the original view of the school. In fact, by their means only we shall be able to form an exact notion of the characteristics of each school.† It was therefore a well-conceived idea of Dr. Ballantyne to publish the Sútras of the reputed founders of the systems of Hindu philosophy, in order to render possible a more correct and extensive knowledge of them than there had existed before. To extend the use of those works to the learned in general, he accompanied the original with an English translation, and as the Sútras, independent of an explanation, would be useless to any one, not perfectly acquainted with the systems, he added to the Sútras extracts from their commentaries together with a translation of them, with the exception of the Sánkhya Tattwa-Samása Sútras, of which he gave the whole commentary, doubtless, because it is so short and easy, that there was no necessity for an extract. To give extracts only from the other commentaries, was judicious. An edition of the whole of them would have for a long time retarded the

* Vid. "Lecture on the Sánkhya Philos." p. 23. The Bhagavad Gítá is also quoted in the commentary (L. on the S. P. p. 23) and if Lassen's conjecture is correct (Vid. his second edition of the Bhagavad G. p. xxxvi.), that the Bhagavad Gitá was composed about 5 centuries before S'ankara, the commentary could not be older than the third century A. D. This is probable indeed, but yet doubtful.

† For instance, if one reads first the Védánta Sára, as an introduction to the Védánta, he will of course think, that the doctrine of the Máyá is an original tenet of the school; or in studying first the Bhásha Parichhéda,—one is inclined to believe, that the doctrine of the categories, of the atoms, of the soul, &c. &c. belongs to the Nyáya, while all these notions are produced by the Vais'éshika, or also, that the theory of the syllogism in the form, as it is deduced in that work, is the theory of the founder of the Nyáya, while it appears from his Sútras, that his deduction differs in important points.

plan to give an although preliminary, yet precise view of those systems, which was more than any thing else required for the present; for almost all those commentaries are voluminous and abstruse works, and in those parts, which expound a view of the system in all the intricacies of argumentation, or in its relation to other systems, difficult to be understood, while, on the other hand, those parts which explain the mere sense of the Sútras, are generally clear and easy.

Dr. Ballantyne has executed his task with great care, tact and with the philosophical attainments necessary for the success of such an undertaking. Mere philological competency was here not sufficient, where it must have been the principal point to understand the exact bearing of philosophical principles, methods and discussions. But even the mere philological difficulties are not few or insignificant; first, the MSS. are generally very indifferent, because they have been, in most cases, transcribed by persons little or not at all acquainted with the subject; secondly, the language of the commentaries themselves is often obscure; thirdly, there is a number of technical terms, belonging to each system, whose exact meaning cannot be learnt from the dictionaries, or an acquaintance with other parts of Sanscrit literature, but only from a close study of the system itself, and special care must be taken not to confound the meaning which a technical term has in one system, with the meaning of the same in another. There is another difficulty, which ought to be at least touched upon, viz. the weight of illustrious names, whose authority has not only become great, which is quite right, but almost absolute, than which there is nothing more pernicious in science.

The translation of the work before us is excellent. It is, like all the translations of the author from the Sanscrit, more literal than we have ever found any English translation. The sentences, it is true, are sometimes very much twisted to keep as closely as possible to the expressions of the original; but they remain *always* intelligible, and convey the sense of the original with an exactness as could not have been otherwise obtained. And this is in philosophical works, such as the present is, which reject all beauty of language, a great advantage; for here the precision, with which the notions are defined, is of the highest importance.

The general remarks on the Sánkhya (p. 52 to 65) in which Dr.

Ballantyne endeavours to show the coincidence of thought of the Sánkhya in several respects, with some of the newest systems of philosophy, are judicious, and define clearly the points which must be thoroughly known, before an understanding of the system is possible; but in his comparison he goes sometimes too far. There is no doubt, to all philosophers of any time or clime the same materials are given for their speculation, viz. the phenomena of external and internal nature, and it must be expected, that in many points their ideas must concur; but there is yet a vast difference between the rough attempts of the commencement of speculation and the ideas of such thinkers as Fichte, Schelling and Herbart. Fichte for instance would probably be not well satisfied, if his "ego" (the identity of the object which is thought on, and of the subject, by which it is thought on) would be compared with the "ego" or Ahamkara of the Sánkhya which is a production of nature (that is to say, which is merely objective) finite and altogether opposite to idealistic notions. Also Herbart's "essence that assumes different properties which come before us in sensation," is in every way opposite to the "indiscrete" of the Sánkhya; but this view may be owing to the conception of Mr. Morell (in his "History of Philosophy") which is far from exact.

It is to be hoped, that Dr. Ballantyne's labours will contribute to revive the zeal for a more thorough study of Hindu philosophy, especially in India, where the literature of the Hindus is not, as in Europe, estimated and studied according to its deserts. Dr. Ballantyne has done a real service to the friends of philosophy by his publication of the Sútras; a beginning has thereby been made of a more thorough acquaintance with one of the principal elements of ancient Hindu life; at the same time there remains a wide field for exertion viz. the publishing and translating of the principal works of each school of philosophy, and we cannot forbear thinking, that the present generation cannot escape censure, if they neglect to use the means at their disposal to further such an undertaking for which by their situation they seem especially called upon.

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The Zafarnámah : a Dialogue between Aristotle and Buzurjumihr.— Translated from the Persian by Bábu NARASINHA DATTA.

Buzurjumihr.—How should one's life be spent?

Aristotle.—In endeavouring to gratify the hearts of others; for God is pleased with him, who endeavours to please others.

B.—How can one be said to please another's heart? *A.*—By submitting one's self to the will of God; as one cannot please a king without obtaining the good opinion of his dependents, so God is not pleased with one unless he be good to his creatures.

B.—What should one's occupation be? *A.*—The acquisition of knowledge.

B.—What is the effect of the acquisition of knowledge? *A.*—The acquisition of knowledge makes mean, great; poor, rich; stupid, acute.

B.—How can the right path be known? *A.*—By the light of knowledge.

B.—How is the way to heaven secured? *A.*—By conquering one's passions.

B.—How can one conquer them? *A.*—By eating little.

B.—How can one live by eating little? *A.*—By lessening one's food by degrees every day.

B.—What is meant by the world? *A.*—All that is fleeting and useless for the future.

B.—How can one procure honor? *A.*—By eating little, talking little, and injuring little; for the wise have said, "Little eaters are less injurious than much eaters."

B.—Upon whom is hardship to be imposed? *A.*—Upon one's ownself.

B.—What is that thing which being sown in one place is reaped at another? *A.*—Doing good in this world, of which the fruit is enjoyed in the next.

B.—How can one please God? *A.*—By pleasing his parents.

B.—Whom should one consult? *A.*—The wise.

B.—Who is wise? *A.*—He who, after hearing much and thinking judiciously, says little.

B.—When should one speak? *A.*—When no one else is speaking.

B.—How can a virtuous person be known? *A.*—By three things: learning, munificence and a smiling countenance.

B.—Who is munificent? *A.*—The dônor of a ready gift.

B.—What is the utmost extent of generosity? *A.*—The giving away of all that is in one's possession.

B.—What is the worst of actions? *A.*—Absenting one's self from the assembly of the learned.

B.—What is the best of actions? *A.*—To be present at the meeting of the learned, and assisting the infirm and the necessitous.

B.—Who are learned? *A.*—They who know what God is.

B.—Who are they that know what God is? *A.*—Those who injure no one.

B.—Who are those that injure no one? *A.*—Those who think themselves inferior to others.

B.—How can one attain this? *A.*—By frequenting the society of sages.

B.—What should one learn from the wise? *A.*—To please God.

B.—What should one do to please God? *A.*—Obey his will.

B.—What are the marks of obedience? *A.*—Resignation and thanksgiving.

B.—Who is worthless? *A.*—A loquacious fellow.

B.—Who is disappointed? *A.*—He who is deficient in adoration.

B.—What is intellectual light? *A.*—The remembering of death.

B.—What is intellectual darkness? *A.*—Devotion to eating and sleeping, and gold and silver.

B.—How should one consider himself in the world? *A.*—Like a traveller in his way.

B.—How can one reach his journey's end? *A.*—By being himself unencumbered.

B.—What is dearer to one than life? *A.*—Religion to the faithful; wealth to the impious.

B.—How can one be known? *A.*—By his works.

B.—When does truth resemble falsehood? *A.*—When an old man recites the valorous feats of his youth, or a pauper relates the liberal actions of his better days.

B.—How can one avoid a bad friend? *A.*—By asking what is wanted.

B.—What governs a woman? *A.*—Compulsion.

B.—What does a degenerate son resemble? *A.*—A superfluous finger, which, if lopped off, gives pain, if suffered to grow, becomes a blemish.

B.—What augments friendship? *A.*—Inquiring about one in his absence.

B.—What withholds friendship? *A.*—Borrowing money; for the wise have said, "Borrowing is to friendship, what a pair of scissors is to a piece of cloth."

B.—How should one drink? *A.*—Slowly and in small draughts.

B.—How should one rise from his meals? *A.*—With some remains of appetite.

B.—What beside aliment preserves health? *A.*—Three things: viz. wearing clean apparel, perfuming one's self, and seeing one's friends.

B.—What is the cause of the immutability of speech? *A.*—Veracity.

B.—Who is agreeable to all persons? *A.*—He who speaks the truth.

B.—Who is a speaker of truth? *A.*—He who does not tell a lie.

B.—Whether is truth or gratitude to be preferred? *A.*—There is no gratitude without truth.

B.—Who is patient? *A.*—He who has forbearance in anger.

B.—What makes one righteous? *A.*—Good and lawful food.

B.—What is good and lawful food? *A.*—That which is earned by an honourable profession.

B.—What is the best of professions? *A.*—Agriculture.

B.—What is the worst of professions? *A.*—The selling of wine.

B.—What is the distinction between man and woman? *A.*—The same as between heaven and earth, for unless the former rain, the latter cannot prove fruitful.

B.—What makes one free from the love of the world? *A.*—Resignation and thanksgiving.

B.—What does association produce? *A.*—A good or bad impression on one's mind.

B.—How should one receive a guest? *A.*—With kindness; that is, one should first welcome and then entertain him.

B.—What is the antidote of sin? *A.*—Repentance.

B.—What should be the constant duty of one who is wealthy? *A.*—The distribution of food to the hungry.

B.—What should a beggar do? *A.*—Be patient and grateful.

B.—What should a farmer's business be? *A.*—To depend entirely upon God and relinquish difficulties.

B.—What is fortune? *A.*—It is that from which proceeds all that one receives.

B.—What is fate? *A.*—It is that which deprives one of what he needs.

B.—Who is intelligent? *A.*—A seeker of the true purport of things.

B.—Who is unintelligent? *A.*—He who is inattentive to the true purport of things.

B.—What is youth? *A.*—Health.

B.—What is age? *A.*—Weakness or inactivity.

B.—What befits youth? *A.*—Modesty and intrepidity.

B.—What befits age? *A.*—Deliberation.

B.—Who holds intercourse with God? *A.*—He who is constantly occupied in devout meditation.

B.—Who is esteemed by all? *A.*—He who distributes justice impartially.

B.—What is love? *A.*—Love is a pearl.

B.—What is a lover? *A.*—A lover is a diver.

B.—Should a guest sleep or wake? *A.*—He should wake: for sleep is the brother of death.

B.—What improves comprehension? *A.*—Disquisition.

B.—What begets heart-break? *A.*—Disappointment.

B.—What is the fruit of virtue? *A.*—The attainment of one's wishes.

B.—What ennobles one? *A.*—Continence.

B.—What is continence? *A.*—The knowledge of the pure esculent.

B.—What leads to the knowledge of the pure esculent? *A.*—The internal eye.

B.—What is the internal eye? *A.*—The eye of the mind.

B.—How can one see with the eye of his mind? *A.*—By being perfect.

B.—What makes one perfect? *A.*—Maturity.

B.—How is maturity acquired? *A.*—By erudition and discrimination.

B.—What is erudition? *A.*—A consummate knowledge of the precepts of religion.

B.—In what does discrimination consist? *A.*—In leading a virtuous life.

B.—What is the height of ignorance? *A.*—Injustice.

B.—What is injustice? *A.*—Acting unworthily of one's self.

B.—What pleases one? *A.*—His own offspring.

B.—What displeases one? *A.*—Death.

Literary Intelligence.

Mr. N. Bland of Randell's Park is preparing for publication a new edition of the Dywan of Háfiz, with the Life of the poet in Persian. No man, either in India or in Europe, is better able to give us a correct edition of the greatest of the lyrical poets of the Persians than Mr. Bland; he possesses a most profound knowledge of the Persian language and has ampler materials for correcting the text at his command than any body else.

The same gentleman anticipates that he will be able next winter to lay the first volume of his history of the Persian poets before the public. It will contain a resumé of all available Tazkirahs, and the number of poets of whose lives and writings it will give an account, must therefore far exceed five thousand.

Mr. E. Hall of the Benares College, intends to compile a Hindustani and Hindi Dictionary. With due respect for the excellent work of Mr. Shakespear, I am certainly of opinion that such a work is needed, Shakespear's book, being a work of learning, is particularly poor in idioms and local terms. Many things have different names in different places. Thus at Lucknow the convex tile which in roofing is placed upon two concave tiles کھپرا to connect them, is called کھونگھا and at Delhi, it is called اکوپا. In reference to the want of idiom, I am convinced that not even a good Hindustani scholar could, with the help of Shakespear, read the Dywan of Myr Yár 'Alyy, it being written in the language of ladies.

Native literature offers us unfortunately very few materials towards Dictionary, they are the Nafáyis alloghát, compiled by Awḥad aldyn .

Aḥmad Belgrámy in A. H. 1253, and printed in the Moçtafá Press at Lucknow in A. H. 1257. It is a quarto volume of 940 pages, and contains chiefly Hindi words with their meaning in Persian and Arabic and with illustrations from poets. So great is the demand for a work of the kind, that this book has been for several years out of print, and two abridgments have been printed of it; one the Anfas alnafáyis in A. H. 1263, and the other the Montakhab alnafáyis in A. H. 1264.

Makhzan alfawáyid a collection of Hindustani idioms illustrated by passages from poets, compiled by Irshád, and lithographed at Delhi, in 1845, fol. 357 pages. This is a very valuable book.

Grammar of the Urdoo language explained in Urdoo by Mawlawy Imám Bakhsh, lithographed at Delhi, 1845, 8vo. 295 pages. The third chapter of this book contains a collection of words, and the fourth, proverbs and idioms.

Toḥfat al-Hind by Myrzá Khán, a son of Fakhr aldyn Moḥammad. It is divided into a preface, which treats on the letters of the Hindus (the Devanagary alphabet), seven chapters and a conclusion; the first five chapters treat on the metre, rhyme, rhetoric, loves and music of the Hindus. The sixth treats on the science called Kôk. This chapter is a Persian translation of a well known Sanscrit work. The eighth chapter treats on physiognomics according to the Hindus, and the appendix on lexicography; but the preceding chapters contain the explanation of a very great number of Hindi terms. This book has never been printed and MSS. are rare, but it seems that Mr. Shakespear has carefully used it. The whole work is to be considered a free translation from the Sanscrit and Hindi into Persian.

Gharáyib alloghát, Hindi terms explained in Persian by 'Abd al-Wasy of Hansy. This book has not been printed: there exist MSS. of it which contain merely an abstract, and have sometimes a different title.

It is very desirable that a Hindustani Dictionary should contain those English terms of which the orthography has been fixed in Hindustani such as "inch" "feet" the names of the months, &c. also that it should be to some extent encyclopædiacal, that is to say, contain not only explanations of words but also of things. Mr. Hall will find the Kachsháf içtiláḥát alfonún, or explanation of the terms used in

sciences, invaluable for this purpose, though it contains merely Arabic terms. It is the work of Mohammad A'la of Saharanpore, who was engaged on it sixty years, and completed it in A. H. 1158. He is dead. The Arabic and Persian medical terms are in the Bahr aljawáhir. Hindi technical terms are in Persian translations of Sanscrit, and Hindi works which are rather numerous, and treat on various subjects, such as cookery, the occult sciences, the manners of the Jogies, songs, medicine, the veterinary art, &c. and they are intended by the translators to illustrate the manners and sciences of the Hindus.

In the last number of the Journal, when writing about the Satyárnab, we expressed a wish, that the Vernacular Literature Committee of Calcutta should publish an illustrated Bengali periodical in the plan of the *Penny Magazine*. We have since heard that such a work is already in the press, and will be published early in October next.

The *Purnachandrodaya* press has lately issued an edition of Sir William Jones's translation of the Hitopadesha.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL.

FOR MAY, 1851.

The Monthly General Meeting of the Society, took place on the 7th May at the usual hour and place,

Hon'ble SIR JAMES COLVILE, President, in the chair.

The proceedings of the previous Meeting were read and confirmed.

The Librarian submitted a list of Books presented to the Society since its last Meeting.

A letter was read from Prince Gholám Mohammad, presenting a copy of the *Wellesley Despatches*, for the Library.

From Bábu Peary Chand Mittra, Librarian, Calcutta Public Library, forwarding a copy of a Persian Book entitled *Hadyqat al Alam*, presented to the Society by Nawáb Seráj al Mulk Bahádur, of Hydarábád.

The following gentlemen, proposed and seconded at the April Meeting, were balloted for and elected ordinary Members :—

H. Woodrow, Esq. M. A.

Joseph Fayrer, Esq. M. D.

Candidates for election.

Col. *P. B. Cautley* ; proposed by A. Grote, Esq. seconded by Major Baker.

F. Oldham, Esq. ; proposed by B. J. Colvin, Esq., and seconded by A. Grote, Esq.

Notes were received from Andrew Hay, Esq., Dr. R. Young, and Major H. M. Durand, intimating their desire to withdraw from the Society.

The President proposed for the sanction of the Society, in accordance with the notice given at the last Meeting, that the Council be authorised

to expend from the Oriental Fund, a sum not exceeding five hundred, Rs. (500), in getting such of the Persian, Arabic, and Urdu, Manuscripts as require to be newly bound—rebound, also in getting such of them as require transcription—transcribed. The proposition was agreed to.

He next laid on the table a letter from Capt. Hayes resigning the office of Secretary to the Society, and proposed that the Society express their grateful sense of the services which, in the capacity of Secretary, Capt. Hayes has rendered to the Society.

The motion having been seconded by J. R. Colvin, Esq., was carried unanimously.

The President then stated that Dr. A. Sprenger having expressed his willingness to accept the office of Secretary, the Council had appointed that gentleman a Member of Council and Secretary in the room of Captain Hayes, subject to the confirmation of the Society, and moved that that appointment be confirmed.

The motion was confirmed.

An order of the Council granting leave of absence for six months to the House Sergeant, F. Halligan, on medical certificate, was announced for confirmation by the Society. Ordered that the leave granted to the House Sergeant be confirmed.

In consideration of the changes which the new Code of Bye Laws, and in particular Bye Law 52, has made in the organization of the Council, the President tendered on behalf of himself and his colleagues in the Council, their resignation to the Society, and proposed that the June Meeting be made special for the election of a new Council. The proposal was adopted, and the Council was requested to continue in office until the election of their successors.

Mr. Mitchell gave notice that he will, at the next Meeting, call the attention of the Society to the following passage in the last number of the Journal, and move that Mr. Piddington be called upon to withdraw or explain it.

"It may be proper, specially in reference to certain insinuations, which I refrain from qualifying, made at the July Meeting of the Asiatic Society, regarding the Museum of Economic Geology, to preface this report with the following letter, &c."

The following communications were then laid before the Society.

1st. An inscription of a decayed Mosque, from Mr. Beaufort. Mr. C. Beadon supplied the following details regarding it: "The inscription is taken from a decayed Mosque at Burh, in the district of Patna; the stone in which it is carved might easily be obtained at no other cost than the expence of carriage from Burh to Calcutta."

2nd. The President stated the substance of a private letter which he had received from Major Lang, with a drawing of the Gate of the Adynah Mosque at Gour, taken under the superintendence of Captain Layard, Executive Officer at Berhampore, and recommended that a letter be addressed to the Government of Bengal, expressing the hope of the Society that the Government will give permission to Captain Layard to visit Gour, whenever he can do so consistently with the performance of his official duties, for the purpose of prosecuting his researches amongst the ruins, and procure drawings of the same. Resolved accordingly.

3rd. From W. Seton Karr, Esq., Under Secretary to the Government of Bengal, a letter enclosing, for such use as the Society may think proper, a paper in original, entitled "Notes on the Dophlas and the peculiarities of their language."

4th. From Capt. Drury, communicated by Major General Cullen, Travancore, through the Hon'ble W. Elliott, a paper on Roman Coins discovered in Cannanore, on the Malabar coast.

Resolved—that the thanks of the Society be conveyed to the Major General, and the Hon'ble W. Elliott, and that he be requested to favor the Society with as complete a series of the coins as may be convenient, and to allow the loan of a complete series to have a set of electrotype casts made of them.

5th. From Dr. Bedford, Rámpur Bauleah, a valuable paper entitled, Suggestion for the extension, and perfection of vaccination simultaneously with a systematic study of epedemic and endemic diseases in India. Thanks were voted to Dr. Bedford, and his paper was referred to the Council.

6th. From E. Blyth, Esq., Notice of a collection of mammalia, birds and reptiles, procured at or near the station of Cherrapunji, in the Khasia Hills, north of Sylhet.

Confirmed, June 4th, 1851. J. R. Colvin.

For June, 1851.

The Society met on the 4th instant at half past 8 P. M.

J. R. Colvin, Esq., Senior member of the Council present, in the Chair.

The proceedings of the previous meeting were read and confirmed.

Read a letter from Captain Skinner, presenting 12 copper Coins found at Ambugamma, on the south of Adam's Peak, forwarded through Mr. Beadon. Mr. Skinner observes that "they were discovered in cutting a very high bank, for a road. A few coins of the same character were a short time ago discovered in Jaffna." These coins appear to belong to ancient Hindu Dynasties of Ceylon and their counterparts have been published in Marsden's Numismata Orientalia, but without any clue to their exact date.

Mr. Beadon presented a Bactrian silver coin, stating that it had been received from central India.

Ordered that this coin be placed in the Museum of the Society, and further enquiry be made as to the place in which it was found.

The Librarian submitted a list of presentations to the library.

The following gentlemen, proposed for election at the last meeting, were balloted for and elected ordinary members.

Lieut.-Col. P. B. Cautley.

Professor F. Oldham.

Mr. Mitchell called the attention of the Society, according to notice given at the last meeting, to the following passage in the Journal for January last, and moved, that Mr. Piddington be called upon to withdraw or explain it.

"It may be proper, especially in reference to certain insinuations, which I refrain from qualifying, made at the July meeting of the Asiatic Society, regarding the Museum of Economic Geology, to preface this report with the following letter."

It was explained by the Chairman on the part of the Council, that they regretted the appearance of the expression objected to, in the Journal of the Society, and that they would certainly have struck them out, had their attention been called to them before publication.

Mr. Piddington expressed his regret for the inadvertent and hasty use of such expressions.

Upon these explanations Mr. Mitchell withdrew his motion.

The Council submitted to the favorable consideration of the Society, an application from Bábu Rájendralál Mittra for the employment of a Pandit at Rs. 20 per mensem, payable out of the Oriental Fund, to copy the Lalita Vistara and to assist him in preparing that work for the press; the allowance to be continued for one year. Sanctioned on the proposal of the Chairman, seconded by Dr. A. Sprenger.

Notice was given of a motion, for consideration at the next meeting, by Rev. J. Long, that a report be rendered to the Society of the sum expended during the last three years out of the Oriental Fund on the following objects:—

The pay of the Editor or Editors; allowance granted to Pandits; the sum appropriated to printing; works printed; and the amount realized by sale of the publications.

Reports from the Curators were laid on the table.

The following communications were laid before the Society—

1st.—On the adaptation of the Aneroid for the purposes of surveying in India, by Dr. G. Buist, Bombay.

2nd.—On the influence of the Moon on the weather, by J. Middleton, Esq.

3rd.—An English translation of the Vichitra Nátak, by Capt. G. Siddons.

4th.—A Conspectus of the Ornithology of India, Burma and the Malayan peninsula, inclusive of Sindh, Asam, Ceylon and the Nicobar Island, by Mr. E. Blyth.

5th.—A translation of the Zafarnámáh: a Dialogue between Aristotle and Buzurjumihr; by Bábu Narasiñha Datta.

6th.—A notice of the Manda Cave Temples, by W. Roberts, Esq. Joint-magistrate of Mirzapur.

Ordered that the Secretary refer to the Secretary to the Goverment of India, Home Department, and to the Secretary to the Government of the North Western Provinces, if necessary, for the drawings alluded to by Mr. Roberts.

7th.—Extract from a Journal up the Koladyn-river, Zillah Akyab, Arracan, in February, 1851, by Captain S. R. Tickell, B. N. I.

The meeting was now declared special for the election of a new Council and Office-Bearers, and Rev. W. Kay and Mr. Grote, were appointed scrutineers.

The following was the result of the ballot.

President, Sir James Colvile.

Vice-Presidents, Sir H. M. Elliott, K. C. B. Dr. W. B. O'Shaughnessy, and Welby Jackson, Esq.

Secretary, Dr. A. Sprenger.

Council, Sir James Colvile, Kt., Sir H. M. Elliot, Dr. W. B. O'Shaughnessy, Welby Jackson, Esq., J. R. Colvin, Esq., Rev. Principal Kay, C. Beadon, Esq., A. Grote, Esq., Bábu Ramgopaul Ghose, S. G. T, Heatly, Esq., A. J. M. Mills, Esq., Dr. A. Sprenger, Major W. Baker, Capt. W. H. L. Thuillier, and H. Walker, Esq.

Confirmed, 2nd July, 1851. J. W. COLVILE.

Report of the Curator of the Museum of Economic Geology for June.

GEOLOGY AND MINERALOGY.

I have put into the form of a paper for the Journal my report on the Shalka Meteorite, which has the peculiarity of being one of those in which no Nickel is to be found, and but a small portion of Chromate of Iron. As we possess however, very complete details of its fall, and its structure and composition are very remarkable, the acquisition of this valuable specimen adds something to our knowledge of those wonderful and mysterious bodies.

Captain W. S. Sherwill, Revenue Survey, has sent us some very handsome specimens of the Natrolite variety of Zeolite, in very fine acicular crystals in trap rock, from the Rajmahal Hills.

I have handed to our Secretary for publication a continuation to the present day of my Index to the Geological, Mineralogical and Palæontological papers and Analyses from Vol. XI. of our Journal which was there brought down to the close of Vol. X. As affording at once a condensed view of the Society's labours in these great branches of its pursuits, and to the student and speculator immediate reference to every paper on the subject which engages their attention, these papers are found alike curious and useful.

I have also put into the form of a paper for the Journal, the description and examination of HIRCINE, a new resin, which may be recent or mineral;

for all our information regarding it amounts to this, that I have received it from Mr. Theobald, Senr. who informs me it comes from Ava. He is in hopes of procuring more for us and full information of the locality. The peculiar properties which distinguish it from all other resins are its remarkable goat-like odour when heated, and a sort of double combustion, this last is a highly curious property which I have fully described in the paper.

Economic Geology.

Captain Haughton of the S. W. Frontier Agency, has sent us a very good specimen of surface coal from a new locality, which he calls Gomeah, near Hazareebagh, accompanied by some of the rocks which are analogous to those of the Burdwan mines. He has also sent us some common rocks and iron ores from a place called Koberma (or Hurruma by Tassin's Map) and with these, three specimens of Mica, white, brown and red; the two last are particularly fine specimens. Captain Haughton states them to be from mines on a forfeited estate which is annually rented, and the tenant "is bound to present yearly to Government one piece of good shape on renewal of his lease as a specimen of the quality produced."

Captain Wallage of the H. C. Steamer Nemesis, has sent us some very fine specimens of Fibrous Antimony from the Sarawak mines.

For July, 1851.

The monthly General Meeting of the Asiatic Society for July, 1851, was held on the evening of Wednesday the 2nd instant.

Sir James Colvile, President, in the Chair.

The proceedings of the last meeting were read and confirmed.

A letter was read from Messrs. Allen and Co., London, presenting, on behalf of Major Abbott, a copy of his Journey to Khiva.

The President of the Natural History Society of Batavia, presented a copy of the Transactions of that Society.

Chevalier Casella, Consul General of his Majesty the King of Sardinia, presented in the name of his Majesty, 3 vols. of engravings representing the paintings and pictures in the Royal Collection at Turin.

Resolved that the Secretary be directed to return thanks, through

the Consul, to his Majesty the King of Sardinia, for the valuable present, and to enquire to which of the public institutions of Turin, the Society can appropriately offer its publications.

The Librarian submitted a list of presentations to his department.

Rev. J. Long moved, according to notice given at the last Meeting, that a report be rendered to the Society of the sum expended during the last three years, out of the Oriental Fund on the following objects: viz. The pay of an Editor or Editors; the allowance granted to Pandits; the sum appropriated to printing; works printed; and the amount realized by sale of the publications. The motion having been seconded by the President was carried nem. con.

The President announced that the Council have appointed the following Committees, viz.

1*st.*—*Committee of Finance*, to consist of Messrs. A. J. M. Mills, A. Grote, and S. G. T. Heatly.

2*nd.*—*Committee of Library and Journal*, to consist of Rev. W. Kay, Captain Thuillier, Mr. J. R. Colvin, Mr. Heatly and Dr. Walker.

3*rd.*—*Committee of Oriental Literature*, to consist of Messrs. J. R. Colvin, Dr. Roer, Mr. C. Beadon, Rev. J. Long, Rev. W. Kay and Babu Ramgopaul Ghose.

4*th.*—*Committee of Natural History*, to consist of Dr. Falconer, Dr. Walker, Major W. C. Baker, Mr. A. Grote and Mr. A. Mitchell.

Communications were read—

1st.—From H. Cope, Esq., announcing the formation of an Agri-Horticultural Society, in the Panjab.

Ordered that the future publications of the Society, viz. the Journal, and the Bibliotheca Indica be sent to it.

2nd.—From W. Seton Karr, Esq., Under Secretary to the Government of Bengal, intimating that his Honor the Deputy Governor of Bengal has been pleased, in compliance with the wish of the Society, to permit Captain Layard, to prosecute his researches amongst the ruins of Gour.

3rd.—From Bharatachandra Siromani, Professor of Law, in the Sanscrit College of Calcutta, soliciting patronage to an edition of the Dáyabhága published by him.

4th.—From Mr. F. E. Hall, submitting a list of works lately published in Benares.

5th.—From Captain Sherwill, enclosing two papers for the Journal, one entitled, "Notes of a Tour through the Rajmahal Hills," and the other "A sketch of the Behar Mica Mines."

Ordered for publication in the Journal.

6th.—From Major Hannay, Ásám, submitting a brief notice of the Sil Háko, or stone Bridge, in zillah Kámrup, with a drawing. Referred to the Committee of Journal and Library.

7th.—From Captain Dalton, Gauhatty, forwarding a paper entitled "Notes on the Mahápurushyas or a sect of Vaishnavas, in Ásám." Referred to the same.

8th.—From Captain Siddons, continuation of his translation of the Vichitra Nátaka.

9th.—From Captain Fytche, a short description of the site and of the circumstances under which he found the slab of stone with an inscription in the Chandra Gupta (?) character, presented by him to the Society, in November last. Referred to the Journal Committee.

10th.—A Memorandum from the Librarian suggesting that an original Map of Sikim by Dr. Hooker, a reduced copy of which has been offered to the Society by Captain Thuillier, be printed in the Journal. Ordered for publication.

Thanks were voted for the above donations and communications and the meeting adjourned.

Confirmed with the exception of the resolution proposed by the Rev. J. Long and seconded by the President, which, in consequence of an informality, is not confirmed.

(Signed) Jas. Colvile.

3rd August, 1851.

For August, 1851.

The Society met on the evening of the 6th instant, at the usual hour.

Sir James Colvile, President, in the Chair.

The proceedings of the previous meeting were read and confirmed with the exception of the Resolution proposed by the Rev. J. Long and seconded by the President, which in consequence of an informality was not confirmed, but the Council, having adopted it as a motion of

their own, brought it forward and it was confirmed as a motion of the Council. The returns required by that resolution were accordingly ordered to be submitted to the next meeting.

Donations were received :—

1st. From Bábu Prassanakumar Tagore. A table of succession according to Hindu Law.

2nd. From Dr. Mann, through Captain Thuillier. A map of Canton and its environs, in Chinese, found in the Bogue Forts.

It was proposed by the President, seconded by Major Baker, and resolved, that the thanks of the Society be conveyed to Dr. Mann, for the present.

3rd. From Lieut. E. G. Pearse. Fac-simile of an antique relic found in a tope on the banks of the Hunnu river in the Hazara country.

4th. From General Cullen, Travancore, through the Hon'ble W. Elliott. Eight Roman gold coins. General C. also submitted fifteen other Roman gold coins for the inspection of the Society and in order to enable them to secure electrotype casts of the same.

The President proposed that the best thanks of the Society be conveyed to the General and to the Hon'ble W. Elliott, for this handsome donation. The motion, having been seconded by Mr. C. Beadon, was carried *nem. con.*

5th. From Rájá Pratápchand Siṇha. A whip snake.

The Librarian submitted a list of books presented to the Society during the month of July last.

The Zoological Curator's Report for the last month was received.

Lieut. Faithful was named for ballot at the next meeting : proposed by Mr. J. R. Colvin, and seconded by the President.

Communications were received :—

1st. From B. H. Hodgson, Esq. Darjiling, enclosing a Supplementary notice of the Shou. Ordered to be printed in the Journal.

2nd. From Captain G. Siddons, forwarding continuation of his translation of the Vichitra Nátaka.

3rd. From Dr. E. Röer, remarks on the Nyáya Philosophy.

4th. From R. N. C. Hamilton, Esq., Resident at Indore, a report on the Turan Mull hill. Referred to the Journal Committee.

5th. From Chevalier Joseph Cassella, Consul General of His

Majesty the King of Sardinia, in reply to the Society's resolution of July last, regarding the King of Sardinia's present.

The President proposed that the publications of the Society be presented, through Mr. Chevalier Cassella, to the Accademia Reale delle Scienze in Turin. The motion was seconded by Mr. Beadon and carried.

6th. A letter from Dr. Wilson to Dr. Röer, regarding the Bibliotheca Indica, was read and ordered to be referred to the Philological Committee.

Confirmed, 3rd Sept., 1851.

(Signed) J. R. Colvin.

Zoological Curator's Report for August Meeting.

Since the publication of my last Report (p. 213, *ante*,) the following specimens have been presented for the Society's museum.

1. From R. W. G. Frith, Esq. Selections from a collection of skins and entire specimens in spirit, procured at Cherra Punji in the Khásya hills; an account of which is given in a paper submitted to the Society at a previous meeting. Also a pair of *Platydactylus gecko*, procured at Dacca.

2. From Capt. Barry, of the Arracan Local Battalion. A skin of *Sciurus bicolor*, peculiar in its colouring.

3. W. Robinson, Esq., Assam. A specimen of *Pteromys magnificus*, and various shells, comprising *Anodonda soleniformis*.

4. From Capt. W. S. Sherwill. Specimens of shells collected on the summit of the Rajmahal hills, comprising an *Achatina*, new to the Society's collection, and, subsequently, another collection from Darjiling, comprising a *Cyclostoma* which also is new to our Museum.

5. From Capt. Croker, H. M. 24th Regiment. Selections from a collection of bird-skins procured at Wuzirabad, supplying the Society with good specimens of certain species of which we previously possessed but very inferior examples.

6. From the Barrackpore Menagerie. Two dead examples of *Felis bengalensis*.

7. From C. S. Bonnevie, Esq., Christiania. A few Norwegian specimens, consisting of the skin of a young kitten of *Felix lynx*,—a fine example of *Nyctæa nivea* (the great Snowy Owl), in a different phase of plumage from the specimen previously in the museum,—*Athene passerina* (vera),—*Philomachus pugnax*,—*Podiceps cristatus*, winter dress,—*Uria troille*, do.,—*Grylle grænlandica*, young,—and *Mergellus albellus*.

8. From myself. A remarkable crab (apparently a new species of *Halimus*), and specimens of an *Echinus* from the Arakan coast.

9. From Bábu Rájendra Mallika. A fine adult male of *Gazella subguttarosa*, the *Ahu* of Persia and Afghanistan, in its short summer pelage,—a phase in which I recognize the *G. Christii*, Gray, stated to be from the Scindian deserts. This animal was received from Bussora when young, together with a young female which at its death was also presented for the museum by Bábu Rájendra Mallika.

E. Blyth.

Asiatic Society's Museum, August 2nd, 1851.

Library.

The following books have been added to the Library during the months of April, May, June and July last.

Presented.

The Palms of British East India, by the late William Griffith, Esq. arranged by John McClelland, Esq. Calcutta, 1850, fol. (2 copies) .—Presented by the Government of Bengal.

The World as it is, shewing the Territories, Colonies, Dependencies, Population, Revenues and Resources of the Principal nations of the Earth. Arranged from several sources and translated by Dr. E. Balfour.—By the Government of Bengal.

A Table of succession, according to the Hindu Law as prevalent in Bengal. Compiled by Bábu Prassanna Kumár Tagore.—By the Compiler.

The Oriental Baptist, Nos. 54, 55, 56.—By the Editor.

The Calcutta Christian Observer, for May, June, July and August, 1851.—By the Editors.

The Upadeshaka, Nos. 53, 54, 55-6.—By the Editor.

The Oriental Christian Spectator for March, April, May, June and July, 1851.—By the Editor.

Letter to the Secretary to the Government of Bengal, from J. McClelland Esq. Secretary, Central Committee of Art and Industry, on the Indian Contribution to the Great Exhibition.—By J. McClelland, Esq.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the months of March, April, May, June and July, 1851.—By the Deputy Surveyor General.

Tattwabodhiní Patriká, Nos. 93, 94, 95, and 96.—By the Tattwabodhiní Sabhá.

History of Bengal, from the accession of Seráj-ud-dowlah to the Vice-Regalty of Bengal to the time of Lord William Bentinck, translated into

Bengali from Marshman's History of Bengal. By Pandit Iswarachandra Sarmá.—By the Translator.

Journal of the Indian Archipelago for February, March, April, May, June and July, 1850.—By the Editor.

Ditto ditto for May and June, 2 copies.—By the Government of Bengal.

Narrative of a Journey from Heraut to Khiva, Moscow and St. Petersburgh during the late Russian invasion of Khiva. By Capt. James Abbott, 2 vols. London, 1843, 8vo.—By the Author.

La Reale Gallaria di Torino illustrata da Roberto D'Azeghio Direttore, della Medesimma, Dedicata A. S. M. il Re Carlo Alberto. Torino, 1836, 3 vols. Rl. fol. and fasciculi 31, 32, 33.—By his Majesty, the King of Sardinia.

Natuurkundig Tijdschrift voor Nederlandsch Indië. Jaargang I. Batavia, 1851, 8vo.—By the Natuurkundig Vereeniging in Nederlandsch Indie.

Relation des Voyages faits par les Arabes et les Persians dans l'Inde et a la Chine dans le IXe siècle de ére Chretiénne Par M. Reinaud.—By the Author.

Géographie d'Abulféda, traduite de l'Arabe en François par M. Reinaud. Paris, 1848, 4to. 2 vols.—By the Translator.

Invasions des Sarrazins en France et de France en Savoie, en Piémont et dans la Suisse, pendant les 8e 9e et 10e siècles de notre ére. Par M. Reinaud. Paris, 1836, 8vo.—By the Author.

Etudes sur la langue et sur les textes Zends par E. Burnouf. Tome I. Paris, 1850. 8vo.—By the author.

Selections from Public Correspondence, published by Authority, North Western Provinces, Parts III. @ IX Agra, 1846, 8vo.—By the Government of the North Western Provinces.

Montgomery's Statistics of Cawnpur. Calcutta, 1849, 4to.—By the same.

Sketch of Mairwara, giving a brief account of the origin and habits of the Mairs, their subjugation by a British Force; their civilization, and conversion into an industrious Peasantry. By Lieut.-Col. C. J. Dixon. London 1850, 4to.—By the same.

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Exchanged.

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Makámát Hariri, translated into English by T. Preston. London, 1850, Rl. 8vo.

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Index to the Edinburgh Review, 2 vols.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of May, 1851.

Date.	Observations made at Sun-rise.						Maximum Pressure observed at 9h. 50m.						Observations made at Apparent Noon.					
	Bar. red. to 32° F.	Temperature. Of Mer.	Temperature. Of Air.	Temperature. W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Temperature. Of Air.	Temperature. W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Temperature. Of Air.	Temperature. W. Bulb.	Wind.	Aspect of Sky.
	Inches	°	°	°			Inches	°	°	°			Inches	°	°	°		
1	29.630	81.4	81.3	79.2	S.	Cirro-strati	29.708	88.2	89.4	81.5	S. S. W.	Cumulo-strati	29.692	91.9	93.3	81.2	S. W.	Cumuli
2	.681	81.0	81.0	79.3	S.	Ditto	.742	88.0	89.4	81.7	S. W.	Cumuli	.715	92.2	93.3	82.4	S.	Ditto
3	.687	80.7	80.6	79.0	S.	Cumuli	.748	87.8	89.7	81.4	S.	Cumulo-strati	.713	92.6	94.0	82.3	S.	Cumulo-strati
4S.	.680	81.3	81.3	79.3	S.	Cirro-strati	.742	88.3	90.3	81.6	S.	Cumuli	.704	92.8	93.8	81.5	S.	Ditto
5	.669	81.6	81.5	79.3	S.	Cumuli	.732	88.8	89.7	81.4	S.	Cumulo-strati	.697	93.0	94.2	81.0	S. W.	Cumuli
6	.705	83.0	83.0	78.7	S.	Cirro-cumuli	.740	89.0	90.3	81.6	S.	Ditto	.706	93.3	94.2	81.6	S. W.	Cumulo-strati
7	.641	82.8	83.0	78.9	S. S. W.	Cirro-strati	.673	89.9	91.3	81.2	S.W. sp.	Cirro-strati	.639	94.3	96.4	83.4	S. S. W.	Cirro-strati
8	.644	81.9	82.2	77.3	S. sharp,	Ditto	.691	88.8	90.0	81.2	S. sharp,	Ditto	.673	92.3	93.5	83.6	S. sharp,	Ditto
9	.643	82.7	83.0	80.2	S.	Cirro-cumuli	.684	89.7	91.3	83.2	S. sharp,	Clear	.659	93.0	94.6	83.6	S. sharp,	Clear
10	.597	83.3	83.4	80.6	S.	Clear	.662	91.0	93.2	83.7	s.s.w. sp.	Ditto	.637	95.5	96.8	85.2	S.	Ditto
11S.	.585	84.2	84.3	80.4	s. w. shp.	Ditto	.637	90.6	92.0	84.5	S. S. W.	Ditto	.598	94.3	95.5	85.7	S.	Ditto
12	.545	85.0	84.9	81.4	S.	Cirro-cumuli	.583	91.0	92.8	83.4	S.	Ditto	.552	96.6	99.0	82.0	S.	Ditto
13	.546	82.8	82.3	80.8	S.	Clear	.614	90.3	93.0	81.0	S. W.	Ditto	.589	96.0	99.2	79.4	N.N. W.	Ditto
14	.635	83.3	82.8	81.4	S. S. E.	Foggy	.681	90.3	92.8	79.5	S. W.	Ditto	.651	96.2	98.9	78.6	N. W.	Ditto
15	.651	83.2	83.2	80.7	S.	Clear	.693	90.6	93.3	82.8	S. S. W.	Ditto	.667	96.8	99.4	83.4	S.	Ditto
16	.684	83.5	83.4	81.0	S.	Cirro-strati	.720	91.2	94.0	83.2	S.	Ditto	.690	97.0	99.0	79.2	S.	Ditto
17	.653	83.3	83.2	80.2	S. S. W.	Clear	.695	91.4	93.6	84.4	S.	Ditto	.664	95.7	97.4	85.0	S. W.	Ditto
18S.	.626	83.6	83.6	84.8	S.	Ditto	.671	91.5	93.6	84.8	S.	Ditto	.640	95.0	96.0	85.8	S.	Ditto
19	.668	84.4	84.4	80.6	S.	Scattered-clouds	.704	91.0	93.2	84.2	S.	Ditto	.689	95.2	96.3	85.5	S. W.	Ditto
20	.681	83.0	82.9	80.2	S.	Clear	.733	90.6	92.6	83.0	S.	Ditto	.716	94.0	95.2	84.0	S. S. W.	Ditto
21	.691	83.0	83.0	80.2	E. S. E.	Cloudy	.711	89.7	91.1	83.0	S. S. W.	Cumulo-strati	.686	94.0	95.4	84.6	S. S. W.	Cumulo-strati
22	.651	83.2	83.7	80.2	S.	Scattered-clouds	.710	88.2	90.0	81.3	S. E.	Ditto	.665	93.0	94.0	82.2	S.	Ditto
23	.659	81.6	81.6	78.6	N. E.	Ditto	.724	90.2	92.3	78.2	S.	Clear	.699	95.0	96.6	79.4	S.	Clear
24	.783	83.2	83.5	79.8	N. E.	Cloudy	.802	85.0	88.0	80.2	S. E.	Cloudy	.751	91.5	93.8	79.8	S. E.	Cumuli
25S.	.761	81.6	81.7	79.0	S.	Cumuli	.825	89.2	92.0	81.4	S.	Cumulo-strati	.781	93.6	96.0	81.6	S. E.	Cumulo-strati
26	.738	82.0	81.7	79.0	S.	Cirro-strati	.819	90.3	93.0	82.7	S. S. W.	Ditto	.775	94.5	96.3	82.2	S.	Ditto
27	.720	83.4	83.3	79.3	S. S. W.	Ditto	.752	90.8	93.0	81.7	S.	Clear	.704	95.4	96.8	84.5	S.	Clear
28	.612	84.3	84.2	80.3	S.	Cldy. to the North	.652	90.4	93.0	78.6	W.S. W.	Cirro-strati	.604	97.8	101.2	81.7	W.	Cirro-strati
29	.564	85.5	85.2	82 2	S. S. E.	Cirro-strati	.608	93.3	96.2	83.8	S. W.	Cirro-cumuli	.554	99.0	101.5	81.7	N. W.	Ditto
30	.509	85.7	85.6	82.6	S. S. E.	Ditto	.536	92.8	94.4	84.7	S.	Clear	.510	97.6	99.5	85.3	S. S. W.	Clear
31	.443	85.3	85.3	82.8	S. S. E.	Ditto	.486	93.0	95.3	85.0	S. E.	Cirro-strati	.455	98.0	100.2	82.8	W.	Cirro-strati
Mean	29.645	83.1	83.0	82.0	....	.....	29.693	90.0	92.1	82.3	....	.....	29.661	94.7	96.5	82.6	....	.....

[*Meteorological Register, continued.*]

Observations made at 2hs. 40m.						Minimum Pressure observed at 4 p. m.						Observations made at Sun-set.						Maximum and Minimum Thermometer.				Rain Gauges.		Moon's Phases	
	Temperature.			Wind.			Temperature.			Wind.			Temperature.			Wind.						Feet. 60.	Feet. 5.		
32° F.	Of Mer.	Of Air.	W. Bulb.		Aspect of Sky.	Bar. red. to 32° F.	Of Mer.	Of Air.	W. Bulb.		Aspect of Sky.	Bar. red. to 32° F.	Of Mer.	Of Air.	W. Bulb.		Aspect of Sky.	Max.	Mean.	Min.	Max. Therm. in Sun's rays.	Upper.	Lower.		Date.
	°	°	°			Inches	°	°	°			Inches	°	°	°			°	°	°	°	Inch.	Inch.		
40	94.6	95.0	81.0	S.	Clear	29.605	94.5	94.0	81.4	S.	Clear	29.597	90.2	88.6	80.4	S.	Cirro-strati	95.4	88.5	81.6	112.6	..	..		1
42	95.2	95.9	81.0	SS.W.	Ditto	.617	95.4	95.5	81.8	S S W.	Ditto	.632	90.0	89.3	80.4	S.	Ditto	96.2	88.9	81.6	115.3	..	..		2
34	95.3	95.7	82.2	S.	Cumuli	.601	95.5	95.8	81.1	S.	Cumuli	.635	92.0	90.4	79.5	S.	Clear	96.4	88.8	81.2	117.8	..	..		3
39	94.3	94.4	81 3	S.	Cirro-cumuli	.604	93.3	92 5	82.0	S.	Cirro-cumuli	.637	89.6	88.4	79.2	S.	Scatter'd-clds.	95.4	88.5	81.6	113.3	..	..		4
46	95.2	95 8	83.4	S.	Cumulo-strati	.629	94.5	94,0	80.4	S.	Cumulo-strati	.649	90,0	88.0	79.7	S.	Cirro-cumuli	96.7	89.4	82.0	112.0	..	..		5
36	95.0	95.8	82.0	S. W.	Ditto	.587	93.3	92.4	82.6	S. shp.	Clear	.607	88.6	87.0	80.4	S. shp.	Cirro-strati	95.8	89.6	83.4	110.4	..	..		6
39	96.0	95.7	84.9	S. shp.	Cirro-strati	.559	94.6	93.6	83.3	ssw.sp.	Cirro-strati	.575	89.2	87.8	80.5	S.	Ditto	98.0	90.7	83.4	112.4	..	..		7
40	95.0	95.6	83.4	S.	Ditto	.583	95.3	95.3	83.1	S.	Clear	.597	90.6	89.0	80.7	S.	Ditto	96.5	89.5	82.5	112.0	..	..	D	8
76	95.8	95.8	84.5	S.	Clear	.565	95.6	94,9	84.0	S.	Ditto	.570	90.4	88.7	81.9	S.	Clear	97.0	90.2	83.3	113.0	..	..		9
68	96.6	96.4	84.6	S.	Ditto	.556	95.7	95.3	85.0	S.	Ditto	.551	90.2	88.3	82.8	S. shp.	Cirro-strati	97.9	91.0	84.0	111.4	..	..		10
55	96.4	97.0	85.2	S.	Ditto	.492	96.7	97.0	85.4	S.	Ditto	.497	92.5	91.0	83.0	S.	Clear	97.6	91.3	85.0	111.8	..	..		11
60	100.5	101.8	78.6	E.	Ditto	.458	101.5	103.0	77.9	WSW	Ditto	.479	95.2	92.7	83.8	S.	Ditto	102.5	94.0	85.5	124.0	..	..		12
62	101.3	103.3	76.4	N.	Ditto	.510	102.0	103.0	77.0	N.	Ditto	.529	97.0	95.3	80.0	N NE.	Ditto	103.0	93.0	83.0	124.2	..	..		13
58	101.3	103.0	74.4	E.	Ditto	.541	101.7	102.4	74.2	S. E.	Ditto	.564	96.2	93.9	83.4	S.	Ditto	103.0	93.3	83.5	122.0	..	..		14
54	101.2	102.4	83.0	S.	Cumuli	.568	101.0	101.3	79.0	S.	Cumuli	.590	94.0	92.8	83.6	S.	Ditto	102.8	93.0	83.2	120.9	..	..	⊙	15
61	100.6	101.7	80.3	S.	Clear	.604	100.4	100.7	79.5	S.SW.	Clear	.596	94.8	93.0	82.4	S.	Ditto	101.9	92.8	83.7	117.4	..	..		16
70	98.0	98.0	85.6	S.	Ditto	.567	97.6	97.0	84.4	S.	Ditto	.534	93.7	92.3	83.4	S.	Ditto	99.4	91.4	83.4	114.5	..	..		17
70	97.4	97.8	85.3	S.	Cirro-cumuli	.563	97.0	96.0	85.0	S.	Cirro-cumuli	.574	93.0	92.0	83.0	S.	Ditto	98.4	91.1	83.8	113.0	..	..		18
64	97.4	97.4	84.3	S.	Clear	.607	96.8	96.3	84.4	S.	Clear	.609	91.6	89.4	80.8	S.SW.	Cirro-strati	98.6	91.6	84.5	114.0	..	..		19
68	96.6	96.6	84.8	S.	Ditto	.624	96.4	96.0	83.5	S.	Ditto	.644	91.0	89.2	81.4	S.	Clear	97.9	90.6	83.2	113.6	..	..		20
60	95.6	96.6	85 3	S.	Cumuli	.583	95.4	94,9	84.3	S.SW.	Cumuli	.599	91.4	89.9	81.0	S.	Cloudy to W.	96.8	89.8	82.7	111.8	0.05	0.08		21
58	95.2	94.8	82.0	S.	Cumulo-strati	.579	94.0	93.2	81.4	S.	Cumulo-strati	.605	90,0	88.4	79.3	S.	Ditto	96.4	89.6	82.8	111.8	..	..		22
9	97.7	97.4	81.4	S.	Cumuli	.599	96.3	95.4	81.6	S.	Cumuli	.634	91,0	89.4	80.4	S.	Cumuli	99.0	90.0	81.0	115.0	..	..	◐	23
2	97.0	97.4	78.4	S.	Ditto	.666	96.6	96.6	78.3	S.	Ditto	.681	92.3	90.6	78.6	S.	Cirro-strati	97.8	88.5	79.2	114.8	..	..		24
2	96.3	96.5	81.0	S.	Cumulo-strati	.679	96.7	96.3	82.3	S.	Cumulo-strati	.685	93.0	91.3	81.2	S.	Cumuli	98.3	89.8	81.2	118.5	..	..		25
7	97.4	98.3	81.6	S.	Cumuli	.674	97.3	96.6	81.0	S.	Cirro-strati	.675	93.0	91.4	79.4	S.	Cirro-strati	98.8	90.3	81.7	116.4	..	..		26
4	98.0	98.6	84.4	S. E.	Cirro-strati	.585	97.9	97.4	82.4	S.SW.	Ditto	.604	92.7	91.2	82.0	S.SW.	Ditto	99.2	91.2	83.2	114.7	..	..		27
7	104.2	105.9	79.0	N.	Cumuli	.488	104.3	104.6	78.0	N. E.	Cumuli	.517	99.5	98.2	82.6	E.E.S.	Cumuli	105.4	94.4	83.4	123.6	..	..		28
3	103.2	104.0	79.4	N. E.	Cirro-strati	.455	104.0	105.0	76.3	w.n w.	Cirro-strati	.472	97.6	95.0	85.0	S. E.	Cirro-strati	105.0	95.1	85.2	121.4	..	..		29
7	101.0	101.8	84.4	S.	Clear	.397	100.4	99 8	84.6	S. E.	Ditto	.451	90.8	87.4	79.9	E.	Cloudy	102.6	94.0	85.4	116.4	..	..		30
7	100.3	100.0	85.8	S. E.	Cirro-strati	.367	99,2	99,2	85.2	S. E.	Ditto	.383	94.5	93.2	84.0	S. E.	Cirro-strati	102.4	93.8	85.2	117.7	..	..	●	31
5	97.7	98.3	82.2	....	.....	29.565	97,4	97.3	81,6	....	.....	29,580	92.4	90.7	81.4	....	.....	99.1	91.1	83.0	115.7	0.05	0.08		

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of June, 1851.

Date.	Observations made at Sun-rise.						Maximum Pressure observed at 9h. 50m.						Observations made at Apparent Noon.					
	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.
	Inches	°	°	°			Inches	°	°	°			Inches	°	°	°		
1S.	29.414	85.4	85.5	82.3	S.	Cirro-strati	29.454	92.4	94.5	84.5	S.	Cirro-strati	29.429	97.3	99.4	85.0	E. S. E.	Cirro-strati
2	.440	86.8	87.0	84.2	S. E.	Cloudy	.493	94.4	97.0	84.3	S.	Clear	.471	99.8	102.3	84.8	S. E.	Cumuli
3	.510	80.0	80.5	78.7	E.	Ditto	.585	87.0	89.2	82.0	S.	Cloudy	.562	92.5	94.6	83.8	S. E.	Cumulus
4	.508	83.0	83.1	80.5	S.	Cirro-strati	.549	90.0	92.3	82.9	S. W.	Cumulo-strati	.570	95.5	97.0	82.2	S. sharp.	Zenith-clear
5	.474	84.0	84.1	81.7	S. E.	Ditto	.495	90.9	93.0	82.0	E. S. E.	Scattered-clouds	.462	96.0	97.5	83.5	E. S. E.	Cumulo-strati
6	.485	85.5	85.7	83.0	S. S. E.	Cloudy	.495	90.2	91.9	84.5	E.	Cloudy	.470	94.5	95.9	83.9	E.	Ditto
7	.437	85.0	85.0	83.0	S. E.	Cirro-strati	.503	90.2	90.8	83.8	N. N. E.	Ditto	.471	85.0	84.9	76.0	N. N. E.	Cloudy
8S.	.448	80.8	81.0	79.2	E.	Ditto	.499	86.8	89.5	82.6	E. S. E.	Ditto	.437	90.8	90.5	81.5	E.	Ditto
9	.429	79.2	79.5	77.8	N. N. W.	Cloudy	.495	82.2	83.5	80.5	N. W.	Ditto	.483	80.5	83.0	79.8	N. W.	Ditto
10	.401	79.5	80.2	78.6	W. N. W.	Ditto	.454	83.7	84.7	79.5	W.	Scattered-clouds	.423	87.9	87.9	82.5	S. S. W.	Ditto
11	.433	79.4	80.0	78.4	S. S. W.	Ditto	.507	85.5	86.9	82.7	S. W.	Cloudy	.499	88.4	89.8	83.3	S.	Ditto
12	.563	78.4	78.7	77.4	S.	Ditto	.591	82.5	84.0	80.2	S.	Ditto	.586	86.1	87.0	82.0	E.	Scattered-clouds
13	.515	80.6	81.5	80.2	E. S. E.	Ditto	.573	80.9	81.8	79.5	S.	Ditto	.573	85.0	83.0	80.5	S. W.	Cloudy
14	.540	79.7	80.0	78.5	S.	Ditto	.595	80.7	81.6	79.5	S.	Ditto	.586	79.8	80.5	78.9	S.	Ditto
15S.	.553	81.2	81.8	80.7	S.	Ditto	.601	85.8	88.7	84.0	S. W.	Ditto	.585	90.0	91.7	84.2	S.	Ditto
16	.575	82.7	83.2	80.5	S. W.	Ditto	.650	85.0	86.0	82.0	S. S. W.	Ditto	.615	89.9	91.0	84.0	S.	Ditto
17	.571	81.5	82.0	78.4	S. W.	Ditto	.625	82.5	82.5	79.8	S. S. W.	Ditto	.575	84.9	84.8	80.7	S. S. W.	Ditto
18	.541	80.9	81.0	76.8	S. W.	Ditto	.577	87.0	88.7	81.3	S. W.	Cirro-strati	.577	91.0	92.2	82.8	S. S. W.	Cirro-strati
19	.590	82.5	82.6	80.0	S. S. W.	Ditto	.619	88.4	90.4	83.0	S. S. W.	Ditto	.621	93.3	95.3	83.6	S. W.	Cumuli
20	.619	83.0	83.2	81.6	S.	Clear	.685	90.0	91.5	84.3	S.	Cirro-cumuli	.644	93.8	95.0	85.2	S.	Ditto
21	.686	75.8	76.0	74.4	E.	Ditto	.757	84.4	86.4	81.8	E.	Cumuli	.698	87.8	85.3	80.3	W.	Cloudy
22S.	.727	77.8	78.0	77.3	E.	Cumuli	.777	85.4	87.3	81.0	S. E.	Cumulo-strati	.739	88.6	87.6	81.2	S. E.	Cumulo-strati
23	.681	79.4	79.3	78.0	S. E.	Cirro-strati	.726	86.4	87.9	80.3	S. E.	Ditto	.696	89.2	90.0	81.6	S.	Ditto
24	.570	80.0	79.7	78.4	S. E.	Clear	.604	85.5	87.0	80.8	S.	Ditto	.575	87.7	88.0	82.5	N. W.	Nimbi
25	.506	81.2	81.8	80.3	S.	Cirro-strati	.547	88.2	89.4	83.4	W. N. W.	Cirro-strati	.516	90.4	90.7	84.2	W.	Cumulo-strati
26	.501	81.8	82.3	81.0	S. W.	Cloudy	.525	85.0	86.0	82.2	S.	Ditto	.507	88.0	88.0	83.0	S. S. W.	Cloudy
27	.473	83.4	84.8	83.2	S. S. W.	Ditto	.514	86.7	87.3	83.4	S.	Cloudy	.482	90.0	90.2	83.2	S. S. W.	Ditto
28	.498	80.0	80.0	79.0	S. E.	Ditto	.581	85.0	85.4	82.0	S. S. W.	Ditto	.568	82.4	81.3	79.8	E. S. E.	Ditto
29S.	.613	80.6	80.8	79.2	S. E.	Cirro-strati	.662	87.8	89.4	82.4	S.	Cumulo-strati	.644	89.0	90.2	82.2	S. S. W.	Cumulo-strati
30	.626	81.9	82.2	80.2	S.	Ditto	.660	88.0	89.2	81.7	S. S. W.	Ditto	.628	91.0	92.2	83.2	S.	Ditto
Mean	29.531	81.4	81.7	79.7	....	.....	29.580	86.6	88.1	82.1	....	.....	29.557	89.5	90.2	82.3	....	.....

[*Meteorological Register, continued.*]

Observations made at 2hs. 40m.						Minimum Pressure observed at 4 p. m.						Observations made at sun-set.						Maximum and Minimum Thermometer.				Rain Gauges.		Moon's Phases	Date.
32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Max.	Mean.	Min.	Max. Therm. in Sun's rays.	Feet. 60. Upper.	Feet. 5. Lower.		
Inches	°	°	°			Inches	°	°	°			Inches	°	°	°			°	°	°	°	Inch.	Inch.		
91	100.3	100.8	86.6	E.S.E.	Cirro-strati	29.369	99.0	98.6	85.8	S. E.	Cirro-strati	29.387	94.4	93.4	84.3	E.S.E.	Cloudy	102.0	93.6	85.2	114.6	..	..		1
17	94.5	94.6	86.0	S. E.	Cumulo-strati	.466	93.4	93.3	83.5	S. E.	Nimbi	.442	80.8	79.6	75.3	S.	Ditto	102.6	94.7	86.7	116.7	0.42	0.48		2
86	96.0	97.8	83.9	E.S.E.	Cumulus	.470	97.0	97.8	82.5	S.	Scattered-clds.	.480	94.2	92.5	81.7	S.	Cirro-strati	97.9	88.6	79.2	114.0	..	..		3
47	97.9	98.0	83.1	S. E.	Scattered-clds.	.430	97.5	97.5	82.5	S. E.	Cldy. to the S.	.421	93.5	92.0	81.4	S. E.	Cloudy to S.	98.9	90.8	82.6	111.9	..	..		4
15	97.8	97.5	83.1	S. E.	Cumulo-strati	.390	96.9	97.5	83.5	S.	Zenith-clear	.410	94.5	93.5	82.0	S.	Cloudy	99.3	91.8	83.7	113.0	..	..		5
92	97.9	98.0	84.0	E.	Ditto	.380	97.0	96.8	85.2	S.	Cumulo-strati	.403	92.5	92.2	82.6	S.	Cirro-strati	98.5	92.0	85.5	110.5	..	..		6
44	84.5	95.0	77.9	E.S.E.	Cloudy	.404	84.0	83.2	77.2	NNE.	Cloudy	.389	82.7	82.5	77.6	E.	Cloudy	91.1	87.9	84.7	103.1	..	..	D	7
44	84.0	81.4	78.5	E.NE.	Ditto	.405	80.5	80.3	78.0	S. E.	Ditto	.442	79.2	79.5	77.8	N. W.	Ditto	95.5	88.1	80.7	108.7	..	..		8
15	80.3	84.0	81.5	S. E.	Ditto	.406	81.8	79.8	77.5	N. W.	Ditto	.397	79.8	80.0	78.5	N. E.	Ditto	91.2	83.9	76.6	103.0	1.28	1.36		9
78	88.5	90.8	84.0	SS.W.	Ditto	.339	90.0	90.5	84.2	S.S.E.	Cumulo-strati	.361	89.0	88.7	82.4	S.	Ditto	91.0	85.1	79.2	101.0	0.21	0.26		10
42	84.0	81.5	78.8	S.S.E.	Ditto	.433	82.1	81.9	79.1	S.S.E.	Cloudy	.433	87.8	82.0	79.4	E.S.E.	Ditto	89.9	84.6	79.2	103.0	0.93	1.04		11
13	90.5	90.9	82.0	E.	Scattered-clds.	.511	85.0	82.7	79.5	W.	Ditto	.528	83.4	84.0	80.5	W.	Ditto	91.5	84.5	77.4	108.0	0.20	0.28		12
18	86.5	85.5	80.6	S.	Cloudy	.494	84.1	82.8	79.0	S.	Ditto	.529	81.8	81.8	79.5	S.	Ditto	94.8	86.7	78.6	111.3	0.40	0.50	⊙	13
22	80.3	80.4	78.9	S.	Ditto	.504	80.7	81.5	80.0	S.	Ditto	.509	82.9	84.0	81.0	S.	Cirro-strati	90.0	84.6	79.2	95.4	0.14	0.15		14
22	93.4	92.8	83.0	S. W.	Ditto	.531	85.3	82.0	79.1	S.	Ditto	.538	81.5	81.6	79.7	S.	Cloudy	96.5	88.1	79.7	110.3	0.60	0.67		15
11	89.9	89.7	84.5	SS.W.	Ditto	.529	89.7	89.2	84.0	S.	Ditto	.547	82.2	87.1	82.5	S.	Ditto	91.9	86.3	80.7	100.1	..	..		16
9	84.0	84.1	80.0	SS.W.	Ditto	.535	84.0	84.8	80.5	S.	Ditto	.535	84.2	85.0	81.7	S.	Ditto	87.5	84.2	80.9	96.0	..	..		17
9	92.4	92.6	84.4	S.	Cumuli	.522	91.4	90.5	84.4	S.	Cumuli	.527	86.9	83.2	81.5	S. W.	Cirro-strati	93.1	86.7	80.2	102.8	..	..		18
0	95.0	94.7	86.2	S.	Ditto	.564	93.0	92.7	83.3	S.	Cirro-strati	.577	90.0	89.4	83.0	S.	Ditto	96.3	89.3	82.2	107.8	..	..		19
5	78.2	77.0	74.5	N. E.	Raining	.672	77.6	77.3	75.0	E.S.E.	Raining	.618	77.0	76.0	73.7	S. E.	Cloudy	95.8	86.0	76.2	109.0	1.46	1.54		20
5	82.8	82.8	79.4	S.S.E.	Cloudy	.690	82.0	81.0	77.7	S. E.	Ditto	.687	80.0	79.8	77.6	E.	Ditto	90.3	82.8	75.2	106.0	0.08	0.13		21
2	87.9	86.0	81.0	S.S.E.	Ditto	.657	85.8	86.0	81.4	S. E.	Cumulo-strati	.671	86.8	86.4	82.0	S. E.	Cumulo-strati	90.5	83.9	77.2	106.8	..	..	☾	22
1	91.4	92.0	81.7	S.S.E.	Cumulo-strati	.586	92.0	92.0	81.2	S.	Ditto	.591	88.7	87.0	80.2	S.	Cirro-strati	92.8	85.7	78.6	110.2	0.04	0.06		23
2	87.5	87.4	82.7	W.	Ditto	.489	88.2	87.6	82.6	WSW	Ditto	.493	84.5	84.7	80.6	S.	Ditto	89.4	84.3	79.2	102.3	1.12	1.20		24
7	92.0	92.4	86.3	S.	Ditto	.437	92.2	91.8	85.4	S.	Cloudy	.489	85.8	82.1	78.5	S. W.	Cloudy	93.2	87.2	81.2	105.0	0.46	0.52		25
1	88.1	88.2	84.4	S.	Cloudy	.447	87.9	88.0	84.4	S.	Ditto	.466	86.9	86.3	83.5	S.SW.	Ditto	89.5	84.7	79.8	95.6	..	..		26
9	91.2	91.0	84.0	S.	Ditto	.411	89.3	88.6	82.7	S.	Ditto	.473	82.0	81.0	79.3	S. E.	Drizzly	91.9	87.6	83.3	101.8	..	..		27
1	81.0	81.6	78.3	S.S.E.	Ditto	.518	83.0	84.8	80.0	S. E.	Cirro-strati	.521	86.9	87.3	81.2	S. E.	Cirro-strati	88.7	84.2	79.6	100.7	0.06	0.09		28
8	92.0	92.4	82.5	S.	Cumulo-strati	.572	91.7	91.8	82.3	S.	Ditto	593	88.7	88.0	80.2	S.	Ditto	92.8	86.4	80.0	108.0	..	..	●	29
9	92.4	92.7	84.5	S.	Cirro-strati	.526	91.8	91.1	83.2	S.	Ditto	.564	88.5	86.0	79.2	S. W.	Drizzly	93.4	87.5	81.6	105.0	0.07	0.11		30
7	89.4	89.5	82.2	....	.....	29.490	88.5	88.1	81.5	....	.....	29.501	85.9	85.2	80.3	....	.....	93.6	87.1	80.5	106.1	7.47	8.39		

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of July, 1851.

Date.	Observations made at Sun-rise.						Maximum Pressure observed at 9h. 50m.						Observations made at Apparent Noon.					
	Bar. red. to 32° F.	Temperature. Of Mer.	Temperature. Of Air.	Temperature. W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Temperature. Of Air.	Temperature. W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Temperature. Of Air.	Temperature. W. Bulb.	Wind.	Aspect of Sky.
	Inches	°	°	°			Inches	°	°	°			Inches	°	°	°		
1	29.569	83.4	83.6	80.3	S. S. W.	Cloudy	29.602	87.8	87.8	81.8	S.	Cloudy	29.584	85.8	86.6	83.7	S. S. E.	Drizzly
2	.569	80.9	81.4	79.4	S. S. W.	Ditto	.578	78.4	78.5	77.6	S. S. W.	Raining	.612	79.2	79.4	78.6	S.	Raining
3	.596	79.3	79.4	77.4	S. W.	Drizzly	.640	82.7	84.2	80.5	S.	Cloudy	.608	87.4	88.0	82.6	S. W.	Cloudy
4	.565	80.8	80.9	78.8	S. S. W.	Cloudy	.602	85.8	86.7	81.5	S. W.	Ditto	.589	88.2	88.9	82.2	S. W.	Ditto
5	.608	80.0	80.3	79.0	E. S. E.	Ditto	.648	80.6	81.6	80.2	S. S. W.	Ditto	.630	82.7	82.8	79.5	E. S. E.	Ditto
6S.	.722	78.3	78.3	77.3	S. E.	Clear	.770	85.2	86.3	80.3	S.	Cumulo-strati	.728	88.7	90.0	81.2	S.	Cumulo-strati
7	.733	80.2	80.3	78.8	S. S. W.	Cirro-strati	.723	85.3	85.8	79.8	S. W.	Cirro-strati	.688	88.0	89.2	81.4	S.	Cirro-cumuli
8	.592	81.6	82.2	80.2	S. S. W.	Ditto	.605	87.0	88.6	83.0	S. S. W.	Cirro-cumuli	.570	90.5	91.2	83.3	S.	Cumuli
9	.576	79.0	79.3	78.2	S. W.	Ditto	.645	84.7	85.3	80.4	E. N. E.	Cumulo-strati	.637	86.0	83.5	80.2	E.	Cloudy
10	.693	79.4	79.4	78.8	E. S. E.	Ditto	.710	85.6	87.2	81.9	S. E.	Ditto	.681	88.6	88.2	81.4	S. E.	Cumulo-strati
11	.667	79.8	80.0	79.3	S. E.	Ditto	.685	85.4	86.4	81.4	S. S. E.	Ditto	.656	87.9	88.3	82.6	S. S. E.	Ditto
12	.604	80.0	80.2	79.3	S.	Ditto	.620	86.5	88.2	82.3	S. S. E.	Ditto	.589	88.0	88.2	83.0	S.	Ditto
13S.	.541	81.2	81.3	79.8	S.	Ditto	.567	88.0	88.9	81.6	S.	Cirro-strati	.555	91.3	92.5	82.8	S.	Ditto
14	.533	81.8	81.9	80.3	S.	Ditto	.585	87.3	88.4	82.3	S.	Cumulo-strati	.538	90.6	91.9	82.6	S. E.	Ditto
15	.514	81.2	81.3	80.3	E.	Ditto	.550	86.2	87.0	82.2	E. S. E.	Ditto	.517	90.2	91.0	82.2	N. E.	Ditto
16	.485	80.4	80.4	79.3	N. E.	Ditto	.503	84.8	85.6	81.2	N. E.	Ditto	.493	87.3	87.4	80.5	E.	Cloudy
17	.459	80.6	80.7	80.0	E.	Drizzly	.483	85.0	85.6	81.2	E. sharp,	Ditto	.466	86.3	85.2	82.8	E.	Nimbi
18	.472	81.0	81.4	80.3	E. S. E.	Cloudy	.522	86.2	87.3	81.6	E.	Nimbi	.476	87.7	89.1	82.4	E.	Cumuli
19	.497	81.4	81.5	79.6	E.	Cirro-strati	.531	84.2	82.8	80.3	E.	Cloudy	.505	83.4	83.2	80.8	ESE. sp.	Cloudy
20S.	.661	81.0	81.2	79.4	S. E.	Cloudy	.737	81.6	80.4	79.2	S. S. E.	Raining	.712	82.2	83.0	81.0	S. S. E	Ditto
21	.661	81.0	81.3	80.2	S.	Ditto	.676	83.6	84.5	82.0	S. W.	Cloudy	.651	86.3	87.0	82.6	S.	Ditto
22	.551	82.0	82.3	81.3	S. S. W.	Ditto	.599	84.0	84.0	80.8	S. S. W.	Ditto	.557	84.8	84.7	81.0	S. S. W.	Ditto
23	.515	79.0	79.4	78.3	S.	Ditto	.558	79.3	79.4	78.6	S. S. W.	Raining	.544	79.0	79.2	77.9	S.	Raining
24	.514	76.8	77.0	76.2	S. S. W.	Drizzly	.571	81.2	82.5	79.1	S. S. W.	Cloudy	.541	84.0	85.2	80.5	S. W.	Cumulo-strati
25	.538	78.8	79.0	77.3	S.	Cloudy	.575	82.6	83.0	78.0	S. W.	Cumulo-strati	.564	85.3	85.8	80.2	S.	Ditto
26	.595	78.7	78.8	77.8	S. E.	Ditto	.633	83.0	84.8	81.2	S. S. E.	Ditto	.601	86.8	86.4	81.2	S. S. E.	Ditto
27S.	.642	79.0	79.0	78.3	E. S. E.	Cirro-strati	.687	82.4	83.4	80.4	S. E.	Ditto	.660	85.0	85.0	81.5	S. E.	Raining
28	.639	79.4	79.8	79.0	S. E.	Ditto	.695	84.2	85.7	80.6	S. E.	Ditto	.645	87.6	88.3	81.4	E. S. E.	Cumulo-strati
29	.645	80.2	79.3	80.5	S. E.	Cirro-cumuli	.686	85.6	86.6	81.3	N. E.	Ditto	.657	88.6	88.2	80.8	E. S. E.	Ditto
30	.639	81.7	82.2	81.0	S. W.	Ditto	.643	85.4	86.7	82.0	W.N.W.	Cirro-cumuli	.608	89.0	89.8	82.8	N. E.	Ditto
31	.539	81.8	80.0	77.0	E.	Nimbi	.582	78.9	79.8	77.3	N. E.	Cloudy	.546	83.2	83.4	79.0	E. S. E.	Cloudy
Mean	29.585	80.3	80.4	79.1	....	.....	29.620	84.1	84.9	80.7	....	.....	29.594	86.4	86.8	81.4	....	.....

[*Meteorological Register, continued.*]

Observations made at 2hs. 40m.						Minimum Pressure observed at 4 p. m.						Observations made at sun-set.						Maximum and Minimum Thermometer.				Rain Gauges.		Moon's Phases	Date.
Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind.	Aspect of Sky.	Max.	Mean.	Min.	Max. Therm. in Sun's rays.	Feet. 60. Upper.	Feet. 5. Lower.		
Inches	°	°	°			Inches	°	°	°			Inches	°	°	°			°	°	°	°	Inch.	Inch.		
29.513	86.8	87.0	83.0	S.	Cloudy	29.503	86.9	87.0	83.2	S.	Cloudy	29.533	81.8	79.5	77.8	S. E.	Drizzly	88.8	86.0	83.2	96.2	1.78	1.86		1
.566	79.8	80.6	79.8	S.	Drizzly	.541	81.8	83.0	81.6	S.	Ditto	.549	82.7	84.0	81.3	S.	Cloudy	84.5	80.6	76.7	89.6	0.10	0.14		2
.559	89.4	88.8	83.6	SS.W.	Cloudy	.532	88.4	87.5	83.3	S.	Ditto	.567	85.2	85.2	82.3	S.	Ditto	90.6	84.8	78.9	100.4	..	..		3
.534	86.3	85.2	81.3	S.	Ditto	.527	83.8	82.5	80.5	S.	Ditto	.570	82.8	83.2	80.3	S. W.	Ditto	89.6	85.1	80.6	101.3	0.54	0.58		4
.588	84.4	84.7	80.6	S.S.E.	Cumulo-strati	.563	84.0	84.8	81.3	S.	Cumulo-strati	.630	83.4	82.7	78.7	S.	Cumuli	85.2	82.2	79.2	101.8	..	..		5
.674	90.3	90.8	82.0	S.	Cirro-strati	.652	90.8	91.2	82.2	S. W.	Cirro-strati	.679	86.7	85.6	80.0	S.	Cirro-strati	91.4	84.7	78.0	106.4	..	..		6
.622	90.3	91.0	81.9	S.	Cirro-cumuli	.589	91.0	91.7	83.4	S.	Cumuli	.600	88.5	85.6	81.0	S.	Ditto	91.8	85.7	79.6	107.4	..	..	D	7
.529	90.0	89.0	82.8	S. W.	Cloudy	.541	82.2	79.6	77.6	N.	Raining	.554	80.1	80.5	78.5	E.	Cloudy	92.2	86.1	80.0	104.4	1.88	1.92		8
.614	82.3	82.9	80.4	S.S.E.	Ditto	.600	83.2	83.4	80.3	S.S.E.	Drizzly	.637	81.7	81.6	79.3	S. E.	Ditto	87.8	83.4	78.9	100.0	0.12	0.16		9
.643	83.2	81.4	78.4	E.NE	Ditto	.629	83.3	84.3	81.8	E.	Cloudy	.668	82.0	81.5	79.4	S.	Raining	89.8	84.5	79.1	104.8	0.52	0.58		10
.602	87.2	87.0	81.4	SS.W.	Cirro-strati	.566	87.6	87.3	81.0	S.	Cumulo-strati	.572	86.2	85.2	80.1	S.	Cumulo-strati	89.0	84.3	79.5	101.3	0.05	0.07		11
.524	91.4	92.0	82.6	S. W	Cumuli	.490	92.0	91.3	82.0	S.	Ditto	.508	87.2	86.3	80.2	S.	Cirro-strati	92.3	86.0	79.7	106.6	..	..		12
.487	92.7	93.2	83.0	S.	Cumulo-strati	.458	90.0	88.8	83.6	S.	Cirro-strati	.487	88.8	87.8	81.8	S.	Ditto	93.6	87.3	81.0	109.2	0.06	0.08		13
.486	89.5	87.2	82.3	S. E.	Cloudy	.468	88.5	88.0	81.3	S.S.E.	Cloudy	.510	84.0	83.0	80.0	S.	Raining	93.0	87.1	81.2	110.4	1.98	2.08		14
.486	85.6	85.6	82.0	S. E.	Nimbi	.446	87.0	87.4	81.7	NNE.	Ditto	.460	87.0	86.4	80.3	NNE	Cirro-strati	91.9	86.4	80.8	106.4	0.12	0.17		15
.438	90.3	90.5	82.0	E.NE.	Cumulo-strati	.404	90.0	89.7	82.2	E.NE.	Raining	.411	84.9	83.3	79.3	E.	Raining	91.1	85.6	80.1	106.8	0.38	0.42		16
.428	85.5	84.5	81.4	S. E.	Cloudy	.418	84.0	84.2	82.0	E.NE.	Nimbi	.426	84.2	83.1	81.2	E.NE.	Cirro-strati	89.1	84.6	80.0	102.5	0.46	0.51		17
.414	91.4	92.2	82.0	E.	Cumuli	.399	91.2	90.6	82.0	E.S.E	Cloudy	.446	90.0	89.9	82.3	E.	Ditto	92.2	86.2	80.2	107.3	0.14	0.18		18
.475	83.6	83.3	80.9	S. E.	Cloudy	.472	84.0	84.6	81.2	S. E.	Ditto	.526	83.0	82.7	80.2	S.	Cloudy	86.0	83.4	80.8	95.8	0.68	0.76		19
.650	81.5	81.3	79.6	S.	Overcast	.632	81.3	81.8	80.2	S.	Overcast	.638	81.8	82.5	81.0	S.	Ditto	84.0	81.9	79.7	86.6	0.10	0.14		20
.578	88.3	88.6	83.7	S.S.E.	Nimbi	.575	86.8	84.6	82.2	S. E.	Raining	.589	83.5	83.0	81.7	W.	Raining	89.7	85.0	80.2	100.0	0.44	0.50	☾	21
.520	82.8	81.6	79.0	SS.W.	Raining	.517	81.8	81.0	79.0	S. W.	Ditto	.530	80.2	80.2	74.5	W.	Ditto	85.4	83.0	80.6	89.3	0.82	0.88		22
.479	79.0	79.2	77.4	SS.W.	Cloudy	.456	80.9	80.6	78.0	S.SW.	Cloudy	.498	78.4	78.4	77.3	S.SW.	Drizzly	80.8	79.4	77.9	82.5	0.49	0.56		23
.480	85.8	86.4	81.2	S.	Cumulo-strati	.461	85.8	85.2	81.0	S.	Cumulo-strati	.514	83.2	84.6	80.3	S. W.	Cloudy	86.6	81.6	76.6	100.0	..	..		24
.530	85.3	84.3	80.2	S.	Cloudy	.512	83.0	83.2	80.2	S.SW.	Cirro-strati	.545	83.3	82.2	78.9	S.	Ditto	87.2	82.9	78.5	102.3	0.12	0.16		25
.551	86.3	85.2	80.8	S.S.E.	Ditto	.541	84.9	84.5	80.4	S. E.	Cloudy	.558	82.5	81.2	78.4	S.	Cirro-strati	88.4	83.3	78.2	103.0	0.08	0.12		26
.584	85.5	85.9	82.0	S. E.	Ditto	.559	85.0	84.4	81.5	S.SW.	Cumulo-strati	.583	83.5	84.3	79.5	S.	Cumulo-strati	88.8	83.6	78.4	106.3	0.06	0.08		27
.579	89.3	89.4	81.8	E.	Cumulo-strati	.556	89.0	88.5	80.7	S. E.	Ditto	.571	87.2	85.6	80.6	S.	Ditto	90.3	84.6	78.9	106.0	..	..		28
.584	89.0	89.8	81.5	S. E.	Ditto	.537	90.2	89.4	81.3	S. E.	Ditto	.558	88.5	87.9	80.9	S. E.	Ditto	90.6	85.1	79.6	109.8	0.05	0.06	●	29
.544	91.4	92.0	82.3	N. E.	Ditto	.500	91.3	92.6	84.0	N.	Cumuli	.523	90.0	89.5	83.5	N.	Cumuli	92.3	87.0	81.7	110.8	0.80	0.88		30
.491	84.8	85.0	80.3	E.S.E.	Cloudy	.467	84.8	85.8	80.8	S.	Cirro-cumuli	.471	84.9	84.0	80.4	S.	Cirro-cumuli	85.4	80.9	76.4	95.8	..	..		31
29.541	86.7	86.6	81.3	....	.....	29.520	86.2	86.1	81.3	....	.....	29.546	84.4	83.9	80.0	....	.....	89.0	84.3	79.5	101.7	11.77	12.89		—

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Notes on the "Mahápurushyas," a sect of Vaishnavas in Asám.—By *Capt.* E. T. DALTON, *Political Assistant Commissioner, Asam, in charge of Kámrup.*

Amongst various tribes of Vaishnavas in Asám, distinguished from each other by differences in doctrinal or ceremonial points of more or less importance, I know of none that for the general respectability and intelligence of the disciples, their number and their success in making proselytes, are more deserving of attention than the Mahápurushyas or votaries of the Borpetah Shostro, a religious community widely spread throughout lower Asam, and extending into Cooch-Behar and N. E. Rungpore.

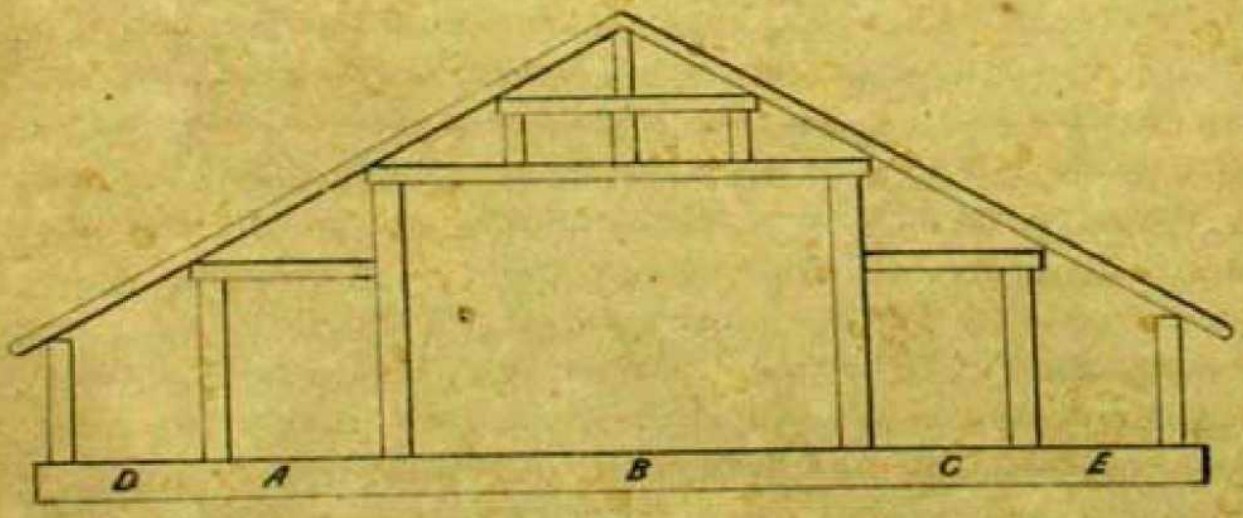
The word Borpetah is variously derived. Some say it is a corruption for Borpáta and means the great throne, great altar, or with reference to the grant of lands conferred on this institution, it may signify great endowment. The sect have many monasteries in different parts of Kámrup and elsewhere, but they are all regarded as subordinate to the great establishment at Borpetah, which is situated in north-western Kámrup, and gives the name to a large Pergunnah, and also to a subdivision of the district and to the station of the Joint Magistrate and Deputy Collector, in charge of this subdivision.

The Pergunnah of Borpetah and others contiguous to it are composed of low alluvial lands liable to periodical inundation. The sites of the villages are all artificially raised, and in the rains the whole country presents the appearance of a vast lake, the raised villages with

their groves of trees forming so many islands; the communication between them, being at this period entirely by water. The retiring floods leave these plains in excellent condition for the cultivation of mustard seed, which in rotation with Áussa dhán, or summer rice, is the staple produce of this part of the country.

Borpetah is by far the largest and most densely populated of these villages. By a census made in 1847-48, that portion of it considered as belonging exclusively to the Shostro and comprising an area of 175 acres, contained 7,368 souls, all of them Bhakats or attachás of the Shostro. From the necessity of economizing space, where raised sites are so scarce, and raising them so expensive, the huts are more closely clubbed together than they generally are in Ásámese villages, still they have a rural rather than a town appearance, being, built without much attention to order, and the huts as well as the roads and pathways, that connect the different portions of the thickly populated grove, being all shaded by noble old trees.

To the south of the grove a large and well raised enclosure contains the great Námghar Shostro, or chief place of worship, and all the other sacred edifices of the institution. The Shostro is a large building with a thatched roof supported on huge posts of the most durable timber procurable. All the Vaishnavas in Ásám have similar buildings for religious meetings, but this one at Borpetah is a chef d'œuvre of its kind and merits description. This section will shew



the plan of its construction. A, B and C are centre and side aisles forming the interior of the edifice; D. and E are open verandahs,

embracing three sides of the building; the fourth is finished off with an open gable across which, and contiguous to the Námghar, there is another smaller building on posts in which is contained a stone image of Vishnu and "Sála'gráms."

The Shostro is one hundred and eighty feet long by sixty in breadth supported on fourteen rows of posts. The altar, covered over with red silk, on which the Bhágavat and other sacred books are deposited under square frames of talc, is placed in the centre aisle in the south portion of the building; and receives light from the open gable above it. There are two entrances, one from the east near the altar, the other from the north facing it, besides which and the gable there is no opening for the admission of light except from spaces cut out in the ornamental carving of a cornice of wood which encircles three sides of the building under the verandah, and through which spaces the portion of the congregation, who not being admitted into the interior of the building, are obliged to confine themselves to the verandah, can see what is going on inside. Near the northern entrance to the right there is a colossal figure of Hanumán and to the left a similar image of Garúr supported on massive frames of timber and painted in bright colours. These images are not worshipped, which, indeed, might be inferred from their position between the congregation and the altar. Down the centre aisle there are two rows of large candelabra of wrought iron each capable of holding some hundreds of small oil burners to illumine the building for the evening service. It is only on great occasions that they are all used, a few near the altar being sufficient for the ordinary services. To give me a better view of the interior of the building they were all lighted for me in the day time, the morning service was then being celebrated and the vista of these pyramids of light with numerous white draped figures to assist in distributing it through the vast gloomy building had a most imposing effect. There is nothing else in the interior of the building worth noticing. The outer or verandah posts are all elaborately but rudely carved, every second or third being a caryatid representing one of the incarnations of Vishnu. None but Bhakats, or disciples, after purification and change of raiment are admitted into the interior of the Shostro. Women are excluded but may sit in the Verandah, and at certain periods join in the spiritual songs.

To the east of the Námghar and at a distance of about twelve feet from it is a small brick temple with a dome, occupying an area of thirty-eight square feet, enshrined in which is a stone about half a cubit long bearing an impression said to be the foot print of Mádhab one of the founders of the Shostro. This is revered as a most sacred relic, and when cholera or other epidemic rages in the village and a time is in consequence appointed for solemn prayer to avert the calamity, this stone is then placed on the altar beside the Bhágavat in the Námghar, and the people on such occasions worship fasting and in wet garments. In front of this temple there is a well, protected by a copper canopy, supported on four light pillars of the same metal, the water of which is considered very holy.

To the north of the enclosure containing these buildings, is the principal entrance, a covered structure of timber grotesquely carved and gaily painted. To the south a flight of rough stone steps conducts to the bed of a nullah and also to a small tank; to the east and west are the cloisters of the monks whom I shall now proceed to describe.

The Mahápurushyas recognize two orders of their sect, the "Udasins" or monks who have renounced the world, and devoted themselves to celibacy; and the "Grihist" or family men, or as they are also called, "Grihi," laymen.

Any Bhakat that pleases may become a Udásin or monk, on his doing so he occupies or shares with another one of the small cells or divisions of the cloisters. He lives on alms going daily his rounds to collect from his friends; and during the remainder of the day and part of the night, he should devote himself to reading or hearing read the history of the two Mahápurushyas, founders of the sect, S'ankar and Mádhab, called the "Lilá Charitra;" practising the three "Veds" 'hearing, singing and remembering,' contemplating and realizing to himself the attributes and form of the deity, for idols he is not allowed to worship.

Each of these monks acts as immediate spiritual adviser or confessor to one or more families of Grihis. It is said they are allowed access at all times to all parts of the house and to all members of the family, and that if the good man of the house observe the monk's long staff with brazen knob (the symbol by which they are known as Udásins in their peregrinations) planted at the entrance of his zenanah, he may

not himself go in till the holy visitor comes out; but this account, suggestive as it is of somewhat too intimate a connection between the spiritual guide and his fair penitents, was not given to me by any member of the sect, though it is very generally asserted.

In the cloisters to the east and west of the Námghar, there are at present one hundred and fifty-seven monks. Long sheds substantially built and enclosed, with front Verandahs from end to end, about six feet in breadth, are divided into apartments, sixteen or twenty feet square, opening out on the verandah by one double door to each. In these apartments the monks live sometimes two together, sometimes one alone. They exercise considerable ingenuity in making their cells commodious, the simple materials of which they are composed do not give much scope for their skill and taste, but the doors and lintels are elaborately carved and the door fastenings, all different, are so many inventions for which each originator might take out a patent. The cloisters and every place connected with the Shostro, are kept scrupulously clean and neat. The monks have a small flower garden in which they cultivate flowers and flowering shrubs used in the religious ceremonies.

In the dress and appearance of these monks there is nothing peculiar to distinguish them from ordinary mortals, with the exception of the long staff already alluded to. For raiment, however, they are required to confine themselves to the simple waistcloth and a small white "chadder" or scarf, and to keep the cloths they wear at worship and at meals exclusively for those occasions.

Detached in other parts of the village there are two other sets of cloisters containing the one fifty-five, the other twenty-six monks. In one of these there is a particular seat from which the head monk reads and expounds. In consequence of a dispute there are at present two who by turns occupy this seat. The old monks are called Ata and Atoi as marks of respect.

There are in the Kámrup district one hundred and ninety-five Shostros subordinate to that of Borpetah. I know not how many there may be in other districts. All those I have seen are built exactly on the model of the parent institution, each having its establishment of Udásins in cloisters, and its "Grihis" or laymen in ordinary dwellings. Five or six of these are to a small extent endowed, that is, have received grants of land held at half rates from the former

rulers of the country, the remainder have no endowment, but they are nevertheless maintained in much better order than the generality of Shostros and temples to which extensive grants have been made, being well supported by a numerous and respectable body of disciples who all pay a very devout attention to the externals of religion.

Of the actual number of this sect I am unable to form any estimate, and from the Shostro manuscripts no information on the subject was to be derived, as they keep no record of their proselytes; but they form a considerable proportion of the population of this district (Kámrúp). I know of two villages each containing two or three thousand inhabitants, the one a village of weavers, the other a village of oil-pressers, all of whom are disciples of Borpetah; and they are numerous in all parts of the district. They also muster strong in Gowálpáráh and Cooch-Behár, and are found, I believe, even in the Dacca district. Wherever they reside they appear to regard Borpetah, with as much reverence as the Mohammadans pay to Mecca, though their great saints and founders, Sañkar and Mádhab, neither died nor were born there, Many respectable men holding offices in the courts of Gowhatty, or fiscal charges of Pergunnahs, have their permanent residences in, and never remove their families from, the sacred grove of Borpetah. They regard it as "the loveliest spot on earth," and a protracted absence from it, they cannot endure. Of the inhabitants of the grove generally I may safely say there is not a more intelligent or a more industrious community in the whole province.

They are most of them traders as well as cultivators of the soil, and their boats with agricultural produce, pottery, &c. are to be found in every creek in Asam, and as far down the Brahmaputra as Serájgunje. In point of education the proportion of those amongst them, that can read and write is far greater than amongst any other class of Asamese that I am acquainted with. The rising generation appear to be nearly all receiving instruction in letters.

As the sect of the Mahápurushyas have sprung up within the last four hundred years it ought not to be very difficult to trace their history, but the desire of the disciples to deify their founders has somewhat mystified their origin.

From the memoirs of his life and writings preserved in manuscript by his followers, Sañkar was born, or, I beg his pardon, the Avatár of

Sañkar occurred at Áli Púkeri, a village of central Ásám, in the year of "Sakádit" 1385, corresponding with A. D. 1464, and departed this life or returned to heaven from Bhela, in Cooch-Behár, in Saka 1490, or A. D. 1569; and Mádhab first appeared in the family of one Hari Collítá in Saka 1433, or A. D. 1512, and died A. D. 1597. They were thus contemporaries of "Sri Chaitanya," who is adored as an incarnation of Krishna, and venerated as the founder of their religion by most of the Vaishnavas of Bengal, and from the similarity of the doctrines inculcated as well as from a tradition to that effect it may be inferred that the Asamese sectarian was indebted, directly or indirectly, to his illustrious contemporary for the system of religion he introduced. Chaitanya,* of whose career the accounts handed down to us are perhaps more to be depended on, was born at Sylhet in A. D. 1485, and died, or was last seen, at Jagannáth in A. D. 1527. The Asamese all admit the interview between him and Sañkar, but the sect of whom I am treating do not wish it to be supposed that either of their founders was under any obligations to the Bengal Saint.

The Lilá Charitra already referred to as the received account of the life of the two Mahápurushyas, is in verse, and dates are excluded as too matter-of-fact for a poetical effusion. According to this poem Sañkar's reputed father, named Cúsim, was one of the chiefs of the country called "Bhuyas." These chiefs have often had the government of Ásám, or of parts of Asam, absolutely in their hands, and the periods of their power are referred to as the times of the "baruh bhuyas," but though they are honourably distinguished as the days in which many important works, tanks, roads, embankments, and the like were executed, their authority as rulers appears to have been always either a provisional or a usurped one, and the expression "baruh bhuyas' rule" is now used to signify a period of anarchy.

Sañkar's father was a "Sudra" of the caste little known except in Asam, called "Collitá." The education of his son he entrusted to a learned Brahman and the only marvels related of his childhood are his extraordinary aptitude for learning and intense application night and day to his studies without rest.

* Ward's Hindus, Vol. 2nd, page 173, As. Soc. Res. Vol. xvi. p. 110.

In his youth he was married, but his wife died, and shortly after on the death also of his father, which appears to have taken place about the same time, he distributed all his property amongst his relations, went on a pilgrimage, visited Gyah, Jagannáth and other places, and returned after an absence of twelve years. He found the civil government of his country in a very disorganized state and was importuned by his friends to resume his position as a chief to assist in restoring order, but this he declined urging that he had now to meditate on all that he had read and seen. They, however, persuaded him to take another wife, and the free gifts he received on the occasion of his marriage were of greater value than all the wealth he had formerly been possessed of. In his meditations on the Bhágavat and Puráns he appears about this time to have been assisted by a Bráhman named Ráma Ráma Guru, whom the Lilá Charitra introduces to us rather abruptly. This Bráhman was, however, the progenitor of the family, who for many generations have held the office of Shasturiah or head of the Shostro, and that may account for his being so prominently brought forward ; but his assistance was not very valuable, as Sañkar did not fully comprehend the sacred books he was studying till instructed in their meaning by a Bráhman who was specially deputed by Jagannáth himself to Sañkar and made a long journey for the purpose with no other address than "Sri Sañkar, Ásám." The name of this Bráhman is not given in the Lilá Charitra but in some other work he is styled Jagadisa Misra. It was about this time that his intimacy with Mádhab commenced. Mádhab was a "Sákta," a worshipper of the female principle. One day he gave directions to his brother-in-law Rámadása to procure a goat for sacrifice, at an approaching festival in honor of Kálí. Rámadása having made known to Sañkar the commission he had received, was advised by him to return to Mádhab without having executed it. The latter displeased at what appeared to him an unwarrantable interference sought an interview with Sañkar and entered on a violent altercation with him—but Sañkar mildly reproved him and quoting from the Bhágavat expounded to him how all adoration should be paid to "Vishnu the Supreme." "For" said he, "if you pour water on the roots of the tree the leaves and branches are refreshed and strengthened by it, applied to the leaves and branches and not to the roots it is of no avail." Mádhab is stated

to have been so much struck with the aptness of this illustration that he at once prostrated himself as a disciple before Sañkar, from that hour devoted himself to the study of the Bhágavat and its commentaries, and became in time Sañkar's most efficient coadjutor in translating these works into the vernacular for the benefit of his countrymen. His merits as a translator and as a faithful follower of Sañkar are acknowledged by all the Vaishnavas in Ásám, but the Mahápurushyas regard the master and the disciple as equally entitled to adoration, and deify them both. If there be any difference, it is in favor of Mádhab. The enclosure of their great place of worship contains a temple in honor of him—his footprint, enshrined therein, is their most sacred relic. They have nothing similar in honor of Sañkar; but the anniversaries of their respective deaths are observed with the same solemnities. The success of Sañkar in proselytizing drew upon him the envious eyes of the Bráhmans, but as they dreaded meeting him in controversy, they are accused in the Lilá Charitra of endeavouring to throw discredit on his doctrines, by ridiculing, reviling and bullying those that received them. The disciples having brought this to Sañkar's notice, he applied to the authorities to bring about a meeting between him and the Bráhmans. This was arranged and Sañkar premising by saying that he would condemn the Bráhmans out of their own mouths asked them, if a sinner and an outcast might repeat the name of Krishna, without having made atonement and being readmitted to caste? They replied that the name of Krishna was of such efficacy that to repeat it with faith was not only permitted but enjoined by him, as the repetition of the name alone was sufficient for atonement, and in this "Kali Yug" it is all that was necessary for man's salvation except the Bráhmans. All present declared that this was what Sañkar had been inculcating, and taking up the cry of Hari! Hari! which he had taught them, the Bráhmans had not a word more to say.

After this Sañkar went about establishing Shostros in different places, and wherever he halted one of these institutions sprung up. Near his own village he founded the Bordúár Shostro the present head priest of which is descended from him through his granddaughter, for though he left sons they had no male issue. In the autumn of his life he again visited Jaggannáth and then it was he had an interview with Chaitanya. He returned from this pilgrimage and recommenced his religious teaching with a more comprehensive library and a greater

store of knowledge, and resigning his mantle to Mádhab finished his career in Cooch Behar in the one hundred and fourth year of his age.

Saṅkar and Mádhab between them translated into Asamese the Bhágavat, Rámáyana, Námamálá, and other Granthas.* They taught their disciples choruses of spiritual songs and several hymns from a work called the Kírttan Grantha. They gave instruction on the names and attributes of God from the books called the Námaghosa, Gunamálá, Lilámálá, &c. and compiled or translated, I do not know which, the Bhakti Ratnábalí, selections from the Bhágavat and the Purans.

The doctrines taught by these divines appear clearly the same as those ascribed to Chaitanya, and perhaps the most essential difference between the Mahápurushyas and the Vaishnavas of Bengal is that the former more rigidly observe and preserve in greater purity what they have received.

They instructed their disciples to acknowledge the existence of only one God, Vishnu the supreme, and prohibited their engaging in the worship of any other deity. They do not ignore the existence of the rival or minor gods of the Hindu Pantheon, but consider that in adoring Vishnu they obtain the favor of them all. They were instructed to acknowledge all the Avatars of Vishnu, but were to regard his appearance as Krishna as the manifestation of most importance to mortals, and to seek salvation by the repetition of his name and contemplation of his attributes. Amongst his other titles he was to be acknowledged as Rádhá Vallabha, or lord of Radha, but Rádhá was to be regarded as inseparably connected with this incarnation of the God, not as a distinct object of worship. In regard to a future state, the doctrines, if I am correctly informed of them, are simple enough. Elevation to Vaikant'ha, the heaven of Vishnu, as the reward of the virtuous, an eternity of 'Narak' hell, as the lot of the wicked.

Those amongst them who were "Grihis," laymen, were permitted to worship the images of Vishnu and Krishna in the form of the Sálagram but all other idol worship was interdicted, and though images of Krishna, Ráma, &c. are set up in some of the places of worship belonging to the Mahápurushyas, no adoration is paid to them except by Bráhmans. To the Sálagram and image of Krishna, offerings of uncooked food are, however, made by the Pujári, a Bráhman, in the name and in behalf of the community. The 'Udásins' are absolutely inter-

dicted all image worship, even of the Sálagram, and the reason assigned for this distinction between them and the laity is that, images or symbols of the deity on which to concentrate the ideas, are required by men whose minds are distracted by family cares and by indulgence in worldly enjoyments, but not by those who have withdrawn themselves from both, and who, if they act up to their vocation, spend the greater portion of their time in holy meditation.

The doctrines of Chaitanya obliterated the distinctions of caste. In all probability those originally promulgated by Sañkar had a like tendency; but at present though the Mahápurushyas have not that reverence for it that is entertained and arrogated by other Hindus, and have more intercourse with each other irrespective of caste than is usual amongst the 'twice-born,' yet the distinction is not altogether effaced, and the Mahápurushyas will not eat *cooked food* from the hands of a brother whose blood is not as pure as their own.

Hindus of all castes are admitted into the fraternity, and once admitted are, with the exception above noticed, associated with on equal terms by all the brethren, and there is nothing more remarkable about this sect than the firmness with which this bond of fraternity is maintained, supporting each other through evil report and good report, bravely and generously. One of the most highly respected of the Udásins is by caste a distiller of spirits. Amongst ordinary Hindus it would be considered degrading to men of caste to associate with such an individual, but now, as a Mahápurushya and a Udásin of acknowledged holiness, his origin is considered no disgrace to him.

Actual privacy at meals, such as is enjoined by some of the Vaishnava divines, the Mahápurushyas are not obliged to conform to. It is usual with this sect when a number get together, to form a mess, the man of the purest caste amongst them cooks for all, and they eat sitting together in one enclosure but not from the same dish. This uncivilized practice of eastern nations they regard with disgust and every man has his own plate to eat off. Though a social fraternity in their own community is thus encouraged, they are obliged to be extremely circumspect in their intercourse with all other sects, who are to them as gentiles. Purification by bathing and change of raiment is necessary before every meal and previous to entering their places of worship, as they cannot transact the affairs of every day life without coming into contact with gentiles, and all such contact pollutes.

Saṅkar particularly warned his followers against the commission of the following crimes, which from their being particularized whilst others of equal or greater importance are omitted, were doubtless those that in the days of his admonitions were most prevalent—adultery, theft, lying, pulling each other's hair, (!) or any violence to the person of another. He also placed his interdict on the use of intoxicating drugs, which is considered to extend even to the use of tobacco, and, in addition to what is abstained from by all orthodox Hindus, he prohibited his disciples from eating or even keeping ducks, pigeons, and goats. Some of these prohibitions are not now much attended to.

This sect of Vaishnavas make nine marks with the chandan or powder of sandal-wood on the forehead, the bridge of the nose, the ears, breast, and arms. As they make each mark they repeat some name but further than this, the rationale of the marking they will not disclose. Perhaps there is one mark for each of the *accomplished* incarnations of Vishnu, or it may be, one for each of the nine Bidhs or modes of acquiring knowledge.

During the life-time of Saṅkar all the Vaishnavas acknowledged him, and him only, as their spiritual head. On his death Mádhab succeeded to this position amongst the Mahápurushyas, but the first Shusturiah or Adhikári of the Borpetah Shostro was a Udásin Bhakat whose name was Mathurá Dása, but who was generally called and is now spoken of as "Burá Atá." He was selected for the office, and installed in it by Mádhab. Mathurá Dása before his death directed the Bhakats in conjunction with the Mahants,* or heads of the subordinate Shostros, to select a successor from the Bráhman family of Ráma Ráma Guru, the learned pundit who studied with Saṅkar, a successor was chosen in accordance with his wishes and since then the vacancies in the office of Adhikári have always been filled by the descendants of this Bráhman. Some assert that such was the injunction of the last Sudra Shusturiah, others contend that the Bhakats are not bound to select from any particular family, but had there been no restriction on their choice, it is not likely that the succession would have so long continued in this one. There have been many sharply contested elec-

* There are four families of these Mahants, all Sudras, one descended from the Ráma Dása who married Mádhab's sister, the other three from favorite disciples and fellow-labourers of the two Mahápurushyas. They signify their ratification of the Bhakats' selection by presenting the Shusturiah elect with the sacred "Málá."

tions, when the Bhakats were divided in opinion, but on no occasion were the nominies of either party selected from any other family.*

The Adhikári is assisted by a deputy called the Desha Adhikári and there are several other office-bearers for the lay and for the spiritual duties.

With exception to certain fees allotted to the Adhikári, all offerings received for religious duties, presents from disciples, fees of admission from proselytes, fees for re-admission to caste and the like are deposited in the Shostro treasury, and credited in the Shostro accounts by the accountant, and no disbursement can be made except by order of the Adhikári with the assent of the Bhakats, or a portion of them forming a sort of committee. The treasury is said to be very rich. The value of gold and silver utensils and ornaments together with the cash in the store-house is estimated at 60,000 Rupees. The annual receipts may average four or five thousand and the disbursements about three thousand. The chief items of expenditure being the subsistence of poor travellers, for whose benefit an establishment of wood-cutters, potters and fishermen is kept up, and the expense of feasting at the great annual festivals all visitors who avail themselves of the hospitality of the Shostro.

The half rent paid to Government for the Dharmmottar lands attached to the temple is also paid from the general fund, nothing on this account being taken from the Bhakats who occupy the land.

For adjudication in disputes brought before the head of the institution, for assessing the amount of fine to be levied from an outcast for re-admission to caste, and for other matters requiring consideration, the Adhikári is assisted by a council which usually consists of two or more members of the family of the "Páṭhak" (reader of a commentary of the Bhágavat) and of the reader of the Bhagavat in Sanskrit, a Bráhman, or one of the family of the "Rajmidhi" who is the man of business of the Shostro in all temporal affairs. These councils are held in a house adjoining the "Námaghar."

Any individual wishing to become a Bhakat or disciple must present to the Shostro an offering of oil, cloths, and a sum of money according to his means. The Adhikári or in his absence the Desha Adhikári then teaches him the Mantra or initiating incantation, upon receiving which he must fee his instructor, and as far as I have learnt,

* This Ráma Ráma Guru was thus the Aaron of the sect, the progenitor of a family of Levites from whom alone the high priests can be chosen.

these are the only fees the Adhikari can claim, though he also receives presents from disciples who visit him after a long absence.

I have not been able to ascertain in what words the mystic Mantra is given. It is an inviolable secret.

It only remains for me to notice the services daily performed in the Shostro. Saṅkar and Mádhab taught their followers that of the nine modes by which knowledge was acquired ("the nobo vid") the most important were "hearing," "singing and remembering," and it is with reference to these, that the following ritual has been established.

1st. The morning service appropriately commences with the songs which the Gopis were accustomed to sing to awaken Krishna.

2nd. This is followed by spiritual songs accompanied by the clapping of hands and striking of cymbals.

3rd. The officiating Bráhman reads a portion of the Bhágavat in Sanskrita.

4th. A portion of the commentaries on the above in Asamese is read by one of the Bhakats.

In the afternoon service.

1st. The commentary of the Bhágavat is read.

2nd. The congregation sing and clap their hands and strike the cymbals.

3rd. The Bhágavat in Sanskrit is read.

The third service is held in the evening, at dusk, by candlelight, at which, 1st, a portion of the "Gunamálá,"

2nd. Portions of the "Lilá málá," and

3rd. Parts of the "Bhotima" are read.

4th. Singing accompanied with cymbals and other musical instruments.

5th. Singing accompanied with the clapping of hands only.

6th. A portion of the commentaries on the Bhágavat or a part of the Asamese translation of the Rámáyana is read. These books are read regularly through till finished, and then recommenced.

At the conclusion of each of these services the name of Krishna is slowly repeated three or four times by the Bhakat who officiates, in a deep, solemn and impressive tone of voice. The whole congregation repeat it after him with equal solemnity, all with their heads reverently bent down till the forehead touches the ground; it is echoed by those in the verandah and taken up by such as may be within hearing out-

side, who all prostrate themselves as they repeat it, and thus it is continued till it is heard but as a faint moan and dies away in the distance. None that have been present could fail to be struck with this very impressive mode of concluding the service.

The superiority of the form and mode of the devotional exercises above described, contrasted with the ordinary temple worship of the Hindus, is apparent enough to attract and retain votaries. Instead of a small shrine into which none but the officiating Bráhman enters and from which no instruction to the crowd outside is even attempted, a large building capable of affording accommodation to thousands is devoted to the purposes of praises of the deity, congregational singing and moral instruction, and to keep up the spirit of the sect as well as to afford them ensamples of holy living, the actions, precepts and chief incidents in the lives of their founders are constantly brought to their recollection.

Amongst the peculiarities of this institution is the almost communistic nature of their system of Government. In other Asam Shostros the resident Bhakats were regarded as little better than slaves of the high priest for the time being, whether the latter office was hereditary or otherwise held, but the Bhakats of Borpetah have all a proprietary right in their Shostro and a share in its Government. Acknowledging the Adhikári as their "Guru," they implicitly submit to his guidance in spiritual affairs but in temporal matters he can take no step without their voice. There are indeed two parties amongst them which we may designate "high and low church," the one admitting, the other disavowing his claim to infallibility, but these are delicate questions with which I will not further meddle.

The institution is less richly endowed by the former rulers of the country than many others of far less importance, but they hold a grant of land conferred on them by Seeb Sing, one of the Ahom rájás of Asám, dated Saka 1657, corresponding with A. D. 1735, in which the rights of the Bhakats are peculiarly recognized. The lands, about 397 acres, being granted to 297 individuals by name who were the heads of the families of the resident Bhakats then existing and to the Shusturiah and Desha Shusturiah and Pujári for the time being the space for whose names is left blank. I am told that they have more ancient grants for a smaller quantity of land from two of the Delhi Bádsháhs but these I have not seen.

A Comparative Essay on the Ancient Geography of India.

(Continued from page 272.)

From *Cach'hara* El Edrisi made *Ghazera*, and probably Cosair.* The names of *Wair*, or *Eirus* are unknown now, at least to the pilgrims, who travel that way. Having doubled the Cape, Nearchus came into a large and commodious harbour, protected by a small island, called by him *Bibacta*, and by Pliny, *Bibaga*; not more than three hundred yards from the shore. The distance from *Crocala* is omitted by Arrian; but Pliny reckons twelve Roman, or ten and a half British miles. *Bibaga* is perhaps a corruption from *Débí-bága*, the garden of *Sitá-devi*, or simply *Debí*, who has several in that part of the country. It is called *Byblus*, in some MSS. *Babulona*, by Philostratus, in his life of Apollonius; perhaps from *Bábul*, the Acacia tree, which abounds all along that coast. This small island, being so close in shore, has not been noticed by late navigators, and possibly it no longer exists as an island. I suppose that this harbour, denominated after Alexander, was at the mouth of the dry river, which I mentioned before.

This narrow passage of 300 yards only, between the mainland and the island, and even the harbour itself at the mouth of a river, is really a *Khári*, or *Khárijuna*, or *Khárizána*, and answers of course to the *Rhixana*, or *Rhizana*, both of Marcian, and of Ptolemy. Nine miles Roman, or about eight British, from it there was, according to Pliny, another island called *Toralliba*, which in Hindi signifies the island of *Liba*; and is obviously Chilney, called by Ptolemy *Codáné*, probably for *Colané*; for there is very little difference between the letters D, and L in Greek; and of course they are often put the one for the other. Besides, this island is opposite to the country called *Cola*, and also *Colwán* by El Edrisi. Ptolemy considered the island of *Liba*, as different from *Colané*, which, in that case, must have disappeared, which is not likely. *Liba* or *Labe* is the name of the goddess *Chandicá*, or the lustful goddess, as we have seen before. *Tora-Liba* is simply called *Tora* by El Edrisi; and in Hindi *Tora*, or *Tara* signify an island. From this place Nearchus put to sea again, and

* See El Edrisi, pp. 56 and 57.

after a course of four miles, stopped under the shelter of a small island close to the shore, and called *Domai*. There was no water; but it was found of a good quality at the distance of about a mile, probably in the dry bed of the canal, or *Nala* of Hanumán. This little island seems to be noticed in some late surveys, and is called *Domail* by El Edrisi; who says, that there was on it a small town called *Cas-Cahar*, which, it is more probable, was on the continent; and the inhabitants of it, are called *Damœi* by Stephanus of Byzantium.

Cahar is, for *Cahir*, *Cahirá* generally pronounced *Cair*. Several places called *Cahira*, in the countries bordering upon the Indus, are mentioned in the Ayin Acberi. I suppose the true reading to be *Kiz-Cahir*, or *Cair* in *Kiz*, or Gedrosia. *Cáraichí* was also called *Cair*, and probably by way of contradistinction *Caer-cede*, *Caer-shede*, for *Cair-Sind*. For the Portuguese in composition sometimes wrote *Cind*, *Cend* and even *Gind* for Sind. Hence we find it asserted, that the Indus was also called *Karshed*. Small settlements have occasionally been attempted on that coast, as I have been told; but they were soon after forsaken, as *Hiñgula-Devi* is averse to them. The country was called *Sañgada*, a denomination now seemingly unknown in that country. It is perhaps from the Sanskrit, and Hindi *Sankhadá*, implying a country abounding with shells, which is really the case.

El Edrisi says, that from *Dabil*, at the entrance of India, and of course *Cáraichí*, to Cape *Mond*, there are six miles (the numbers are obviously corrupted) hence to *Coli* six more. *Coli* is *Domail*. *Cola*, or *Cali* is a creek. From *Domai*, after a course of nineteen miles, Nearchus reached a place called *Saranga*, probably from Rámachandra's seat—*Zerocá*, or in Persian *Seirunga*; which is near it, and a little further, were the rocks called *Sacala*. These are not noticed by pilgrims, probably because there are no legends attached to them: perhaps they are low rocks, forming a ledge, stretching out far into the sea. This was probably the reason, why Nearchus was deterred from going round them; and as there was a passage through them, though very narrow, he preferred to go that way. *Sugala* in Sanskrit signifies the *fair way* passage: in Hindi *Su-Cali*, or *Col* signifies the fair, or safe creek; also a safe narrow passage. In English Gully or Gully-hole, in French Goulet, from the Latin Gula the throat, Galá in Hindi is the throat and Galí, a narrow pass or lane.

From this place Nearchus went to *Morontobara*, which, he says, signifies the harbour of women. *Morontobara* is from the Persian *Moorut-bahr*, the bay, or creek of women or of the woman; and is a translation of its Hindi name. There, according to tradition, reigned a woman in former times; and that woman is *Hiñgulá-Devi*, the mother of mankind. This harbour no longer exists, as I have shewn before: but the creek, through which Nearchus went into the inner bay of the *Arbis* still remains: though no longer navigable. Then Nearchus with the fleet went to the inner mouth of the river. There was a commodious harbour with a large island in front: the water was bad, but by going up the river about 40 stadia, it was found of good quality. This is the harbour of *Argenus*, mentioned by Pliny: and from this place Nearchus crossed the bay, and anchored at *Pagala*, opposite to Sónemeyání; and there is the outward mouth of the Arbis. This is also the mouth of the same river as noticed by Ptolemy, and Marcian. *Arigenus* they call *Rhaprava*: then comes the harbour of women, *Coiämba*, the well of our mother, *Rizana*, and at some distance from it, the boundary of Gedrosia; which being well defined by nature, remains invariably the same, on the banks of the Indian *Háb*, to the eastward of the range of mountains, which ends at Cape *Monz*, and is close to it. *Rhaprava* is from the Sanskrit and Hindi *Ráma-praváh*, the grand canal of Ráma, of which there are two, one to the east, and the other to the west of the *Arbis*; and where they spring from the parent stream, above the bay there was the harbour and village of *Argenus*, thus called, because it was on the western side of the river, in the district of *Haur-Cánán*, or *Haur Caián*; and which, probably from that circumstance, was called Rám-praváh. Ráma-Chandra excavated only part of that canal himself; but as the rest was done by his army, and by his order, the whole very properly is denominated the canal of Ráma. *Coi-Ambá*, signifies the well of our mother, to the south of *Morontabara*, as I observed before.

The distances both in Ptolemy and Marcian, are excessive beyond measure, and stand thus in Ptolemy. From *Pagala* or outer mouth, to the inner one of the *Arbis*, at *Rhaprava*, 60 geographical miles: to the harbour of women, as many; and to *Coiämba*, 60 also: to *Rhizana*, 40: to the boundary, 25. In Marcian, we have from the first to the second place 550 stadia: 500 to the next: 400 to

Coiãmba: the two others are omitted: and, in both authors, the respective distances are not even proportionable. From the inner mouth of the Arbis, to the boundary either at Cape *Mond*, or at the Indian *Háb*, the distance is, according to Ptolemy, 185 Geographical miles, whilst it is really no more than 60 or 67 British miles. *Rizana*, I suppose to be a corruption, from *Kharí* and *Kharíjan*, a creek, and in Persian *Khalij* and *Khaljun* or *Khalzun*: and in the Delta, there is a place called *Kharizana*, according to the Ayin Acberi; and in some MSS. *Charijuna*. These distances must be considerably reduced, and *Rhizana* will be *Alexander's* harbour, which being at the mouth of a river, though dry now, is really a *Kharí*, or *Kharizana*. Besides the narrow channel, between the island and the main, is also a *Charizana*. The *Arbis* or Arabis is called *Carbis* by Æthicus: and to this day it is denominated *Háb* and *Cáb*. It is the Cophes of Pliny, as will appear hereafter. El Edrisi mentions the country of *Araba*, and Father Monserrat says, that the river was called in his time *Arba*, and also Háb; for he takes particular notice of the Indian *Ab*, or *Háb*.

From *Pagala*, Nearchus went to *Cabáná*, called *Cawáná* by Ptolemy; from the Sanskrit Cupáná, and the Hindi *Coowanh*, or the wells. These are the wells of *Aerah*. The next station was at *Cocala*, from its being near the *Háb* or *Colcalá*, or the river of noises; and several streams in India are, from that circumstance, called *Culculya* or *Curculya*. Next comes the river *Tomerus*, called *Tuberus* by Pliny; and now the river *Haur*, *Ghaur*, and *Aghaur*. *Tomerus* is from the Sanskrit *Támra*, one of the names of *Hiñgulá-devi*; and all names, implying a copper colour or *Támra* are applicable to her. The Hindus, however, were not satisfied with this etymology: but they suppose that every thing there was formerly of copper, or *Támra*: but afterwards all the copper was, as usual at this place, turned into stones, still called *Támrá* from their colour. The country to the east of the river *Haur*, or *Támrá*, is *Tamrá*, as far as the *Háb*, and belongs particularly to *Hiñgulá*, or *Támrá-devi*, more generally called in Sanskrit *Camalá*: hence the country, and town of *Camalá*: and the country to the east of the *Háb*, is *Swarṇaca*, or of gold. Philostratus in his life of Apollonius has preserved some curious fragments of antiquity.

Apollonius after leaving the island of *Byblus*, comes to the district of *Pegada*, in the country of the *Oritæ;* where the stones, and the sand are copper, and it is called the golden country from the immense returns in gold from the sale of their copper. Sóne-meyáni, and its district is so called from its golden fisheries, from the large returns in gold, from the sale of the fish. Unfortunately there is no copper in that country: but it was so supposed, and it is enough for our purpose. *Pegada* is for *Pegala;* and Philostratus mentions next a sea-town called *Stobera*, for *Tobera* or *Tomerá*, and the dress of the inhabitants consisted of the skins of the larger kind of fish; as related by Nearchus, of those who lived at the mouth of the river *Tomerus*.

Cape *Múdán* comes next, commonly called *Morán*, and sometimes Málán. It is the *Malana* of Nearchus and it is the mount *Maleus* of Pliny from the Greek Máleos, and Maleon in the country of the *Oritæ*, or those of *Haur*. There, says he, in summer the shadows fall to the south, and in winter to the north. This is true in part only; three or four weeks before, and as many after the summer solstice, the shadows fall to the south: but all the rest of the year, they fall toward the north. Nearchus mentions this circumstance; but he does not say, that it was observed at Cape *Malana:* and this could not be the case, as the season was too far advanced. Nearchus in his journal, going to take leave of India, which terminates at Cape *Malana*, takes notice of a phenomenon which he observed once as he was launching out a great way into the sea; when the shadows in the fore and afternoon fell to the south: but at noon there was no shadow at all. Nearchus, since he left the Indus, kept always close to the shore; and the above observation took place, whilst in company with Alexander, who did really stretch out into the sea from the western mouth of the Indus, about the summer solstice. Though the place, where it was observed at sea, and Cape *Malana*, are without the tropics, yet this phenomenon takes place there, as well as at Benares in the same latitude nearly with Cape *Malan*. As horizontal dials are very inconvenient during the hot winds, I made a vertical one at that place about nineteen years ago, for Mr. Duncan, now Governor of Bombay: and being without the tropics, I thought myself safe. It was in the winter; but to my great astonishment, the dial was of no use, about the summer solstice. At first, in the latter end of May, the remotest hour lines

both in the morning, and in the evening, ceased to be illuminated: a few days after, the next lines were affected in the same manner: and so on gradually, till a few days before, and also after the solstice, when the southern face of the dial no longer enjoyed the rays of the sun: but at noon there was no shadow, as remarked by Nearchus.

The same phenomenon takes place, with a wall placed due east and west; and this unforeseen circumstance subjected me, and my unfortunate dial, to the innocent railleries of my friends. That, this phenomenon takes place at Cape Múdán, and at the mouths of the Indus, though without tropics, I have proved; and that it was observed by Nearchus, there can be no doubt. Truth compels me, as well as the learned Dr. Vincent, to confess, that the language is too express, to admit of a general interpretation; for it is Nearchus speaking of what he had seen. The observation then took place, either eight or ten days before, or as many after the 21st of June, when the phenomenon is sufficiently obvious: for before and after, it is not so: being just perceivable in the morning and evening. This, being once admitted, proves that Alexander was at the mouth of the Indus, in the latter part of the month of June.

Múdán is a derivative form from the Sanskrit *Múḍha*, a head, a headland; *S'irán*, from *S'ira* is used in the same sense: but the Hindus suppose, that it is so called from the *Muṇda* or *Múḍha* the head of Ganes'a, which fell there.

The Hindus consider Hiñgláj, and Cape Mũdán, as the boundary of India, and of course I shall not go beyond it.

Deities of the first rank have generally small districts, or portions of land dedicated to them, and in which they are supposed to reside, at least occasionally. These are styled *vana*, grove or forest; though there should be no trees in it, at least obvious to the sight. These are also called *Vática*, gardens or garden houses; and in the spoken dialects, Bág. The same deity has many not only in India, but all over the world; and they place in every one of them, another embodied form, or rather another self, if I may be allowed the expression.

The arrangement of the different parts in these *Vaticas*, is in general the same, so that, not only the same legend, but also the same description, will serve for every one of them. There are however some exceptions, arising from local circumstances, which are generally over-

looked, and occasion curious mistakes, and we have a striking instance of this in the present case. The place of *Hiñgulá-devi* is not described particularly in any of the Puráṇas, either under the name of *Stríráyjyam*, or of *Mahá-Cála-van*; for *Loca-mátá* is *Mahá-Cáli*, and her consort is *Mahá-Cála*. *Mahá-Cala-van*, or simply *Cála-van*, is called *Colwan* by El Edrisi, and Ebn Haucal *Kelwan*. Yet the description of *Stríráyjyam* in the peninsula, is that of Hiñgláj; for the author has introduced *Daldala* and *Jala-bhumis*, *quagmires* and *quicksands*; which are inadmissible on the summit of the Gauts. The *Cála-van* of Hiñgláj is acknowledged to be the first, and original one. The next to it, is that in which *Ujjaini* is situated: and this is described in the Scanda-puráṇa, in the Section of Avanti: but the author has been more cautious; for instead of the round stones or *gallets* of Hiñgláj, which are not found about Ujjain, he has substituted the fruit of the Bilva tree, which in size and colour looks very much like them; and also is so hard, that a shower of them would effectually repress the boldest assailants. There we are told, that *S'iva* being partial to *Mahá-Cálavan*, called Colwan by El Edrisi and Ebn Haucal, or the forests in which he and his consort lived in their primitive forms, as ancestors of mankind, in the characters of *Mahá-Cála*, and *Mahá-Cáli*, directed four forms of his to watch it constantly. To the east *Bilvés'wara* was placed, or the lord of the stones of the size and in the shape of the fruit of the *Bilva* tree. This is the *Angákeryá-Bhairava Mahá-deva* of our pilgrims. To the north was *Darddures'wara*, or the lord in the shape of a *Bull-frog*: he is the *Tángár*, or *Jánghár-Bhairava-Mahá-deva*, I mentioned before. To the west is *Piñgále'swara*, the lord and consort of *Piñgále'swarí*, or Hiñgulá-devi, and to the south is the fourth form, called *Cáyávarohane'swara*. The seat of the lord *Darddura*, is among the mountains so called after him, and often mentioned in the lists of countries in the Puráṇas, and placed there in the west. His consort *Chan'dicá*, is also with propriety styled *Darddurí*, or *Darddure'swarí*, our LADY in the shape of a *Bull-frog*. *Darddura* is a frog, a toad, but here it is understood of the bull kind, on account of its vociferation and loud noise. In the other *Stríráyjyam*, it is *Hanumán*, the monkey, who produces those tremendous sounds, which either kill people instantly, or drive them to madness.

The seat of *Cáyávarohana* is Cape *Mund*, and leaving out *Cáya*,

which signifies the *body*, remains *Avarohana*, a compound from *Roha*, from which comes *aroha*, *avaroha*, with one or two particles serving to enhance its meaning. We have also *rohan*, and *rohaca*; and as the country above Cape *Mun'd*, is called *Rahun* by El Edrisi, and *Rahúk* by Ebn Haucal, I believe that *Rohan* and *Rohaca* are the true and original names; and the rest to be an idle superstructure of the Pauránics. Be this as it may; *Arohán* is interpreted *dírghatwam*, and *Samuch'chraya*, a ridge, projection, long and high; and it seems that the lord *Cáyávarohana* had stretched out his own body as an obstacle to all intruders into this holy land.

This Cape is called *Wair* by El Edrisi, and *Howair* by one of Renaudot's travellers, from the Sanskrit *Vaihar* or *Waihar*: and in the lists of countries both in the Váyu, and Brahmán'da Purá'nas, we read among the inferior mountains *Vaihár*, *Darddura*, *Coláhala*, and in others *Darddura*, and *Cach'hara*. The three last are well known to belong to that country, and are even noticed by El Edrisi, along with the mountain of *Wair*, *Dordur*, *Cassair*, and *Ghazerá*, *Cola-van*, or *Colwun* which is part of the country of *Hala*. This induces me to suppose that *Waihár* is the same with *Wair*. *Vihár-mun'da*, or *Vihar-mu'dán*, signify in Sanskrit the Fair-head, or Cape, and in a derivative form *Waihár*, any thing fair. Nearchus calls it *Eiros*, probably from *Wair* fair, a vulgar corruption from *Waihár*.

El Edrisi has placed three sets of these mountains, at three different places: but those mentioned in the beginning of the seventh chapter of the second climate belong to this place, which, I believe, was the original one.* The *Darddura* mountains are also called *Daradara*, or Darddara by the Paurániçs, and, I believe, this to be the true name. *Daradara* signifies Cinnabar, and also very small pebbles, an inferior sort of gems.

The latter are found in immense quantities in the mountains bordering upon the sea, and to the west of the Indus. El Edrisi, and one of Renaudot's travellers call these mountains *Dardur*, and the former has also others of that name near the Persian Gulf, where Cinnabar or minium was to be found near the river Hytanis, according to Onesicritus, as cited by Strabo. Mountains of that name, are also placed near the entrance of the Red Sea. The Indian Cinnabar was, accord-

* El Edrisi, pp. 51, 56 and 57.

ing to Arrian procured from the island of Socotora; and was supposed to be the indurated juice of a tree by the Arabs, in whose language Derder is the name of a tree, supposed to be either the Ash, or the Elm.

The pebbles I mentioned before, are of the size of the larger sort of millet, called *Jawár*, and have the same colour with all its variations, such as a light red, and a pale yellow with a small addition of red or faint brass colour: hence they are termed *Támra*, brass or copper: and Philostratus says, that near the Tomerus the stones and the very sand were brass. In their rough state in the quarry, they look exactly like corn coarsely ground, in Hindi *Dardara*, or *Grit* in English. For this reason, they are supposed by pilgrims, to be the remains of *Bhaváni-Devi's* cookery, turned into stones. After being rubbed together, for a considerable time, the outward coat disappears; and then they assume a fine polish. They are afterwards perforated at *Nagar-Thathá*, or Sháh-bandar; and sold to pilgrims one thousand for a rupee, who make chaplets of them. There is a smaller sort of them of the size of that kind of millet called *Bájará*, or *Bázzara*: but these are rejected. *Bázzará* was called *Bosmorus* by the Greeks; who wrote it at first ΒΟΣΣΟΡΟΣ, and probably through the inaccuracy of transcribers, it was afterwards written ΒΟΣΜΟΡΟΣ: thus the second Σ, being inverted, became the letter M.

The author of the Scanda-puráṇa has introduced also the 84 *lingas* of Hiñgláj, which is a contraction for 84,000, the number of regenerations, through the animal, and vegetable kingdoms. *Hiñgulá-devi*, or *Piñgaleswari* is mentioned in the Scanda-puráṇa, in the Revákhaṇda. There the author, relating the different forms of Devi, and their *Sthánas*, says *Payoshṭyám-Pingaleswari*; the place of this goddess is *payoshṭyam*, in or near the waters of the sea. In her character of *Chandicá*, or *Darddurí*, she is also styled *Salurá*, or *Salurí*, synonymous with the latter; and both signifying the goddess in the shape of a *Bull-frog*. She resided in an island called *Selira*, or *Selera* for *Salurá*, according to Philostratus, who places it near *Balara*, or rather *Badara*. Nearchus calls it *Nosala*, from the Sanskrit *Násála*, or the place of ruin and destruction. At some distance, but further off at sea, was another island called *Polla* or *Palla*, which is not now to be found, and as it has not disappeared, it probably never existed.

Ptolemy has increased the number of these islands to four: but the three, which he calls *Asthœa*, *Liba*, and *Carmina* are one only, now called *Ashtola*. These two islands, with a third called *Codané*, for *Colané*, by Ptolemy, and *Toralliba* by Pliny, or in Hindi the island of *Libá*, were the place of abode of queen *Labá*, the goddess *Libido*, or *Lubedo*. Of this third island, Nearchus takes no notice; though he must have seen it often, as he remained at Alexander's harbour, four and twenty days. It was, I believe at this last, that the ship manned with people from Egypt, though probably not of a true Egyptian origin, gave him the slip. They were probably tired of this navigation, and having a good ship, well manned, availed themselves of the superstitious notions of the country, concerning this island; and made their escape. What induces me to suppose, that this happened at this island, is that this transaction, as well as the search of Nearchus, required a few days; and it does not appear, that he made any stay at any of the places near *Ashtola*.

It is then highly probable, that Nearchus willing to preserve the connexion of the narrative of his naval expedition, rejected uncommon occurrences, to the end of one of the three natural divisions of his journal; the shores of India, the coast of the *Ichthyophagi*, and that of Carmania and Persia. Having conducted his fleet all along the coast of the *Ichthyophagi*, and just before he enters the gulf of Persia, he relates the adventure of the whales, near *Cuiza*; and that of the island, the abode of a Nereid. Philostratus, in conformity with Ptolemy, places it near *Badara*: but Marcian carries it a little farther near *Alambateir*. Neither time, nor a change of religion have obliterated these superstitious notions: for Capt. Blair, as cited by Dr. Vincent, writes "We were warned by the natives at Passence, that it would be dangerous, to approach the island of *Ashtola*, as it was *enchanted*, and that a ship had been turned into a rock.... and we saw the rock alluded to, which at a distance has the appearance of a ship under sail."* The same story is related of a rock near Hiñgláj, as I observed before. *Nosala*, or in Sanskrit *Násála*, signifies the place of ruin and destruction: for in Cosás we read, *Nása* ruin is *mrityu*, death; *dwansa*, dashing against stones; *adar'sana*, disappearance; *paláyana*, from *pala*, rout, flight; and *pala* is the root of *palla*, far off; and

* Voyage of Nearchus, Vol. 1st, p. 299, edition of 1807.

this is probably the true etymology of the name of the second island, called *Palla, Polla,* both by Ptolemy, and Marcian; and which probably never existed. Fictitious islands are sometimes introduced, such as Brasil, near the coast of Ireland, the inaccessible one near the Canaries, which seemed to fly off *pala,* before you, and then suddenly disappeared. Pliny, on the authority of king Juba, mentions such an island in the Red Sea, called Topazion; and which often eluded the pursuits of navigators.

Pliny takes notice of the island of *Nosala,* without, however, mentioning its name. Being fond of quaint expressions, he calls it the *reddish* bed of the Nymphs; and probably, there was in the Greek original *Erythra,* or *Erythras;* and this passage should be read thus. This island is the night resting place of the nymph *Erythrá,* in which men and living beings disappear. This is really conformable to the Hindi notions; and the name of this nymph, or goddess, is *Haridrá,* synonymous with *Támrá, Hiñgulá,* and *Piñgalá;* and from it the Greeks made *Erythraios,* or of a purple colour, the shades, and tinges of which were as various among them, as with the Hindus. Pliny has preserved to us some curious fragments, relating to this country; the names are often strangely disfigured, and there are occasionally some transpositions.

He mentions a river called *Manais;* then a tribe called *Augutturi,* who probably lived about Guttar Bay: then comes the river *Borru,* with a tribe called *Urbi;* the river *Ponamus,* near the confines of the Pandœ; the *Caberon,* with a harbour at its mouth in the country of the *Sorœ.* I suspect here a transposition; and I shall attempt to correct the whole in the following manner.

The river *Manais* answers to *Tal-Mena: Augutturi* is *Guttur:* the river *Balomus,* near the confines of the Obandos; the river *Arubá,* with the *Arubi* tribe, near Cape *Arubah:* the river *Tuberus* or *Tomerus,* in the country of the *Oritæ,* or of *Ora.*

The Geography of this country is so little known, that we cannot proceed, but with the utmost diffidence. The old maps of the Portuguese disagree; and transpositions are constantly to be met with. This seems to be a fatality, attending all surveys of that coast, not even excepting the most recent ones, from the Gulf of Cutch toward the west. The best map, in my opinion, is that of Jaó Texeira,

Geographer to the king of Portugal; which was published in the year 1649: and is to be found in Melch. Thevenot's collection of travels. It is unfortunately upon a small scale; and of course not sufficiently explicit. The river *Caorica* is the western branch of the *Háb*, more accurately delineated and placed in the map of these countries, inserted in Lindschot's travels. The next river is the *Camelo*, or *Haur*: then comes a river without name to the east of Cape *Árubáh*, which really exists according to our modern surveys. This Cape is styled there, the point of islands, and the bay to the west of it, the harbour of islands, with a river at the bottom of it. Between this and Cape Guadel, our author has placed three rivers, *Palamate*, or *Palamen*, *Calamete* or *Calamen*, and near Cape Guadel, the river of Noutagues, from a tribe of that name, called Naytagues by Manuel de Faria, and Noytagues or Noytag by Father Monserrat: and this river by both, is placed to the N. E. of Cape Guadel, not very far from it, and seemingly a little to the eastward of the eastern bay. I suspect a transposition with regard to the rivers *Calamen* and *Palamen*: we have ascertained the situation of the river of the *Noytagues*; and there is no doubt, but, that the *Calamen* or *Calama* river is the nearest to Cape *Árubáh*: the Palamen of course will fall in a little to the westward of Cape Passence; and will answer to the place called *Balomus* by Nearchus; and is probably the river *Ponamus* of Pliny, for *Polamus*. It was, says he, a navigable river on the confines of the Pandœ. This tribe is mentioned by Manuel de Faria, under the name of Abindos or Obandos and they were the friends and allies of the Noytags. In another place Monserrat either calls them, or a tribe of them, Heytag; and the pilot, whom Nearchus found at Mosarna in their country and who was called Hydrakes, was perhaps a Heytag. The additional R is no uncommon circumstance: thus instead of Teiz or Teasa, Lt. Porter has Tearsa.

I think the Pandœ, or Bandœ of Pliny, are nearer to the true pronunciation; and that the Portuguese were misled by the affinity with Abindos, a river to the east of Cape Mu'dán, which Monserrat calls in Latin *Ab Indorum rivus*, or the Indian *Háb*.

There is a tribe called *Urbi* by Pliny, upon the river *Borru*: but it is probable, that both the river and the tribe on its banks, went by the same name *Urbi*, *Arbah* and *Ambáh*. To the east of it was *Pasira*, a

place of some note, and whose inhabitants are called *Pariræ* by Pliny, for *Pasiræ* or *Pasirei:* and their borders extended to the river *Tuberus* or *Tomerus*, according to him.

The next place is *Condigrama*, called to this day *Chandigráma*, or the town of *Chandi-devi;* otherwise the fort of *Shabda-coti*. The river *Cophes* is the *Arbis*, being the principal river in the country of *Cuf, Cof*, or *Coph;* which is also, that of a powerful tribe in that country, mentioned by several eastern writers, as Ebn Haucal, &c. The source of this river is called *Habesan*, for *Habé-sar* by El Edrisi* and Khabsar by Ebn Haucal, or the head of the *Háb* or *Kháb*. To the west of the Indus, and in the lower part of its course, and consequently close to the sea, Pliny mentions the tribe of the *Amatæ* so called, because they lived in the country of *Aimátá*, the mother of mankind; who rules over all that region; which is called in the Puráṇas, for that reason, *Stri-rájyam*, or the country of the woman; and this legend is much more ancient than the times of Alexander: for Nearchus says, that, according to tradition, a woman in former times, ruled all over that country. She has three principal forms: the first is of a white complexion, and is *Swétá-devi*, the daughter, and consort of Brahmá; and she is the mother of the gods and of mankind, and the sovereign queen of all living beings. In that character, she has a vast number of places all over the world, which she visits in rotation. Some places she is particularly fond of, as *Hiñgláj*, which she visits every year during the cold weather. The day and hour is fixed, when all the pilgrims stark naked, rolling themselves upon the rough stony ground, call, as loud as they can, "*Ai-Mátá! Sri-mátá!* our blessed mother; *Devi-mátá!* our divine mother, do away with all our impurities." Assuming another shape, she becomes the consort of every *Manu;* hence she is acknowledged by the Musalmans to be *Eve;* and they call her *Bibi-Náni*, our honoured lady and grandmother: and she is held in great veneration by them. The range of mountains west of the Indus, is called the mountains of *Bibi-Náni*. When our first parents were ejected out of paradise with the seducer, *Adam* fell into *Ceylon; Eve* at *Hiñgláj;* and the Devil at *Cabul*. From her oven near *Hiñgláj*, sprang the waters of the flood. Her name is *Brahmi-Sitá*, or simply *Sitá*. The second form is that of

* El Edrisi p. 134, Ebn Haucal, p. 210.

Hiñgulá, called also *Piñgalá*, *Piñgásá*, *Támrá* and *Haridrá*, implying a mixture of a reddish and yellow colour.

From her the river *Haur* is denominated *Támrá* or *Tomerus*; and from *Haridrá* comes in Greek *Erythros*, *Erithrá*, &c.; synonymous with *Phœnix*, *Punikeus*, &c. The third form is *Chaṇdicá-devi*, the *Circe* of the Hindus: and she seems to be the Nereid of Nearchus; for like her, *Chaṇdicá* is very licentious, and turns men into animals, plants and stones.

She is mentioned under the name of Chaṇdánaná, in the only section remaining of *Jaimini's* Mahá-Bhárat; and her magical powers failed before the renowned *Arjuña*. She is also called *Pramilá* in another book, the name of which I do not now recollect. The place of *Chaṇdicá* with the ten millions of noises, makes a considerable figure in the Arabian Nights. It was situated on the confines of India and Persia; and about twenty days march from the metropolis of the latter. The place where the old Derveish, or *Yogi* is entombed, is still shewn to pilgrims; when they go from Sónemehyáni to Hiñgláj, round the bay of the *Háb*. It is at some distance toward the north from the place of noises. The old *Yogi*, the Hindus call the *Guru*, or guide of the pilgrims. As water is scarce there, the mother of mankind had given him a bottle of water, which never was to fail, as long as he performed acts of mercy and charity. His duty was to warn pilgrims of the danger, they would expose themselves to, if they attempted to go to the place of Chaṇdicá; but if they persisted he was to give them the best advice. A young man once put himself under his care, and one day being thirsty and having no water he begged some of the old man; but was refused and died of thirst in his presence. The old man becoming thirsty soon after, had recourse to his bottle: but there was no water in it. He died soon of course, and pilgrims pour water on the spot where the young man was buried, and throw stones at the tomb of the Guru and curse him. Since his death nobody ever presumes to visit the place of *Chaṇdicá*. In the third Volume of the Arabian Nights, Chaṇdicá herself is introduced under the name of Queen *Labé*; and there she is represented in the same words nearly, with the Hindus, except that the unfortunate men, who fall into her hands, remain with her one month only instead of forty days. Prince Beder of Persia being on a visit to his uncle Saleh,

and his neighbour king Samandal, Samunder or Samudri, the Samorin on the Malabar Coast, was transformed into a Crauncha bird, and exiled to some island in that sea. There he was caught by a peasant, who carried him to some king on that coast, where he recovered his former shape. The king having heard his story sent him back to Persia in some of the vessels, which were going to sail for that country. A storm drove the ship on the inhospitable country of Queen *Labé;* and he alone escaped ashore. *Labé* implies covetousness and inordinate desires, from the Sanskrit verb *lubha*, in Hindi *lobhi*. From *lubha* comes the Latin *lubedo* and *libido;* and her name *Libá* seems to re-appear in that of an island, on that coast. *Ai-Mátá* is from the Sanskrit *Ainh-Mátá*, the name of Brahmí-Sitá, who, as I observed in another essay, is *Ecácshara:* that is, her name consists of one letter, which is *I* long, and designates the female power of nature. This letter by mystics, is called the root, and *Ainh* its seed. Thus *Ainh-Mátá* signifies the woman emphatically; or our honoured lady and mother. Hence she is styled the *Woman* simply: at least it was so formerly. This was at first an honourable appellation; but Mahá-deva, as he was on a visit to her made use of it in such a questionable a manner, that the goddess grew angry, and kept him waiting for twelve years at her door; and there is a long, and fulsome legend about this incident. *I* and its seed *Ai*, or *Ainh* is perhaps the mystic Ei of Delphos, concerning which ancient philosophers have said much to little purpose. *Chan'dígrám* was the metropolis of *Strírájya*, in the spoken dialects *Istiríja;* from which circumstance, it is called *Asterusa*, or *Asterusia* by Euhemerus. It was, says he, one of the three towns destroyed by Uranus, or Árhan. This is a well known legend in India: and these three towns are styled *Tripúri*, or *Traipúri* under Tripurásura, who was Tri-Calingádhipati, and had a town in each Calinga. These were destroyed at once, by the unerring arrow of S'iva, who was standing in the district of Tipperah. One of these towns was to the eastward of the Ganges, the other near Amaracan'taca, and the third to the west of the Indus. But this subject I shall resume in my next essay on *Anu-Gangam*.

The inhabitants of that coast were called Ichthyophagi or fish-eaters by the Greeks. By the Paurá'nics, they are styled Matsya-siras, and in Persian romances *Mahi ser* or *Ser-mahi*, Fish heads; a very appro-

priate symbol for a fisherman: being the compound hieroglyphic of fish and man. The legends, relating to *Ráma-Chandra's* journey to Hingláj, are not to be found in the Purá'nas; though otherwise well known all over India, through the pilgrims, who visit Hingláj from all parts of the country. It is the case with many others, which in general illustrate obscure passages in these books, and in many cases are in some measure a supplement to them. The legends existed before the Purá'nas, and this immense compilation does not contain all that were current when they were written. Wishing, however, to connect the journey of Ráma chandra, with his history from the Purá'nas, I consulted several well-informed pilgrims on the subject: they were prepared and ready with an answer.

Ráma having killed *Rávana*, who was a Bráhman, paid a visit to his spiritual guide *Vasishta*, who blamed him for it, as he would certainly be haunted by a fury till his crime was expiated; and for that purpose recommended him to go and worship the mother of mankind at Hingláj. Rámchandra is called *Sultan Serwer* by Musulmans, and Hindus also in the west of India, or the lord paramount of the world. He, with Bharat, is buried at a place called *Nigáhá*, about forty cos to the west of Multan, in the mountains. His tomb is held in great veneration, both by Hindus and Musulmans: and there is held annually a meeting, and fair, to which no less than 100,000 men are supposed to resort. Before I dismiss this article, I shall observe that Maullavi Sáleh, who lived many years in a public capacity at Tha't't'há, described to me the tombs near that city, nearly in the same words with Capt. Hamilton. They are on the left of the road, as you go from the Delta to *Tha't't'há*, among low hills, which form the eastern point of a range coming from the S. W. toward *Thát't'há;* and then suddenly turning to the N. W. The place is called *Mecáli*, and they are now a little more than a mile from the southern extremity of the town; which is not now upon the same spot, where it stood in the time of Capt. Hamilton.

Formerly, says Maullavi Sáleh, the fort was in the centre of the town, and rather nearer to the southern extremity: but now it stands to the north of the town and out of it. This was in consequence of a dreadful epidemic, which desolated the northern part of the town chiefly. People died so fast, and in such numbers that there was nobody to

bury them. They remained in their own houses and the doors were walled up. The unfortunate survivors removed to the south and built huts there. A similar epidemic is mentioned by Hamilton, which carried away 80,000 of the inhabitants. These tombs were built by *Deryá-khán*, a descendant of another person of that name, and prime minister to Jam-Firoz, king of that country, according to Abul Fazil.

This Deryá-khán was only a governor of *Tha'ťťhá*, in the time of Shah Jehan, and who rebelled against his sovereign. Being defeated in battle, he was taken prisoner and brought to Delhi, where he was treated with unparalleled lenity. Capt. Hamilton is entirely mistaken, when he asserts, that he was king of Sind, and of course his descanting upon the misfortunes of the king and queen of Sind, is quite ridiculous and preposterous.

Maullavi Sáleh, declared to me, that there is no arm of the Indus between the town and the hills, and that he is fully persuaded from the nature of the ground that there never was one. The town is about a mile from the river. I conceive also that Capt. Hamilton is mistaken about the distance from Laheri-bandar to *Tha'ťťhá*. I suspect, that he brought his ship to Shah-bandar from which he went by land to Tha'ťťhá; then we must read forty cos instead of miles. His *Dun-ganh* is called *Dun-gurry* in the Ain Acberi; the first signifies the village, and the other the fort of *Dun*.

In the country of *Macaréne* or *Macrán*, Stephanus of Byzantium mentions the river *Maxates*, which is obviously the Macshid of Otter: but its situation is still unknown: and it is not the same river with the *Il-Mend* or *Háb*.*

In the course of the foregoing essay, I have often mentioned Nautical Surveys along the coasts of *Sind* and *Macrán*: for these I am indebted to the learned work of Dr. Vincent. Every attempt of mine to procure them in this country, constantly proved abortive.

* Steph. Byzant. voce Alexandria.

Translation of the Vichitra Nátak or Beautiful Epitome ;—a fragment of the Sikh Granth entitled " the Book of the Tenth Pontiff."— *By Captain* GEORGE SIDDONS, *1st Cavalry.*

(Continued from page 320.)

Chapter. VI.

It behoves me now, to give some information regarding myself, who visited earth, after performing austere devotions on the mountain of Brahm Kúnd, surrounded by the picturesque seven peaks.

On these seven pleasant peaks, the holy Pándavs worshipped. And there I also lived in the discipline of true religion, praying to the Supreme Being, and to the power which comes from God.*

My devotions were so strict, that I became absorbed in God and in his spirit; they were to me as it were my father and my mother; I loved them with all my heart.

The invisible one, was well pleased with my devotion, so much so, that at length, he willed for me to appear on earth, for the benefit of mankind.

I had no wish to be born, for I had given my heart's best affections with all humility to God, but God Almighty deigned to instruct me, and I preach to mankind the doctrines which he taught me.

God thus spoke unto me :—

When first I made the world, I peopled it with angels, and gave to them power and might; but they madly rebelled against me, and refused to obey my commands.

Whereupon I became sorely offended, and created a superior order of beings, with godlike attributes. These sought the worship of their inferiors, and styled themselves gods.

And when mankind was spread over the face of the globe, Mahádév called himself the *Eternal* one. Vishnu called himself *God*. Brahm also claimed *Supremacy*, and no one acknowledged the true and only God.

I then sent eight special messengers into the world, to give evidence concerning me, but these exhorted the people to believe in their divinity, and to worship *them* as gods.

* "Mahá Kál, Kál ká Arádi" Kál is here the spirit of Mahá Kál, emanating from him, as light does from the sun.

So those who knew me not, invoked and prayed to my false messengers. Some with bended knee adored the Sun, some the winds of Heaven, and some Fire.

Some hewed idols from the rocks, and fell down and worshipped them. Others prayed to the mighty ocean, and many with frightful ceremonies offered their devotions to *death*.

Those whom I sent to witness of me, bore false testimony of themselves; setting aside my instructions, they disseminated doctrines of their own.

They would not acknowledge me, neither was I even slightly remembered of them. And men became prouder and more arrogant daily, making for themselves gods of stone.

I then sent religious devotees, who turned against me like their predecessors: verily every clever man, who was born, invented and spread abroad some new tenets of his own.

So that none believed in the true God, none understood my creed. Mankind was confused with ignorance and folly, and animosities raged in the hearts of men, as forests are fired by a single spark.

Sects arose in every direction, and many were the creeds which sin imagined, and vanity taught, but the people were mad, for no one recognized me.

I then sent the Rikhis, who false to the trust imposed upon them, scattered abroad the seeds of their own impure doctrines, which took root in the hearts of men, so that they forgot me, all, save a few. Brahm thereupon composed the four Véds, which pleased the world greatly, and were much esteemed. A faithful few clung to me, disregarding even the poetic influence of the Véds.

Aye! and those who cared not for the Véds, neither for the Koran, but putting their trust in me, believed, were saved from many evils which distressed those who had no god to protect them.

Those who heeded not false doctrines, but clung in patient hope to me, were received into heaven, and will never more be separated from their God.

Those who indulge the foolishness of caste, and claiming exclusive privileges, forsake my path, are condemned to inhabit earth, in various forms, and at last their portion will be hell.

There came one called Dut,* who established a creed of his own, he recommended that there should be long nails to the fingers, and that the hair should be platted, but he forgot me.

To him succeeded Gorakhnáth,† who converted mighty princes. He advised his followers to bore their ears, and to wear large glass ornaments in them, but he forgot me.

Then there was Ráma, the Joyous, who founded the tribe of Byrágis. These wear necklaces of wood and beads, and cover their bodies with white ashes, but he forgot me.

In short the more talented the being was, whom I created, the more he inculcated vain doctrines of his own. Mohammed came, and held religious sway over Arabia.

He propagated his notions and told mankind that heaven could only be gained by mutilation and circumcision; he aspired to a divine origin and taught people to abandon me.

All in fact clung to their own tenets, and few acknowledged me. Therefore in pity for the blindness of my people, I called Govind Siñh, and instructing him, sent him forth into the world, to proclaim these my words—

Oh Govind Siñh! Thou art as it were my son, I send thee to make many converts. Scatter abroad the seeds of my religion withersoever thou goest, and turn men from their folly and evil ways.

Govind speaks:—

I stood in humble obeisance, and bowing my head reverentially, replied, Great God, thou willest it, and I shall be the instrument for spreading thy religion throughout the universal world.

And so God sent me, and for this purpose came I into the world that I should teach all of you the revealed word of God, without animosity or ill feeling towards those who differ.

Beware, I would not that you should think me divine, those who style me God will be doomed to eternal perdition. I am but the poor servant of God, never think otherwise of me.

I am only the servant of God, whom he sent into the world to clear away all doubts, and arrange all the confusion which exists. I will

* Datya, the third of the name, who founded the Sect, Sannyásis.

† Gorakhnáth the founder of the Jogi tribe.

explain all that God hath taught me, and not all the opposition, nor the scoffs of the people shall deter me from my purpose.

I will reveal the word of God,
And listen to no other creed,
I will mix with no other sects,
But teach *His* good doctrines only.

I will worship no vain idols,
Nor idly bend my knee to stone,
I will praise the only true God,
Whose goodness is, to me, well known.

I will not, ever, plait my hair,
Nor deck my ears with crystal rings,
I'll act as God hath order'd me,
And listen not to foolish things.

I will glorify the *one* God,
And all, that he desireth, do,
I will praise him, and him only,
Because his creed alone, is true.

He, gracious, will enlighten me,
On him alone my thoughts shall rest,
He dwells for ever in my mind,
And all who love him, will be blessed.

Those who implicitly believe
In God, can't err, and sin defy ;
Grief harms them not. Who disbelieve,
Amidst tormenting scruples die.

For this cause only, was I born
To spread *His* word, where'er I go,
And those who put their trust in him
Shall cope with wretchedness and woe.

For this cause only was I born,
Hear me, oh, erring mortal, hear!
I have come to give thee comfort,
To wipe away the mournful tear.

Most grossly, have ye been misled,
By those who did, myself, precede,
They have not pointed out the paths
Which surely will to heaven lead.

Oh! ye shall never be deceived
Who put your trust in him alone,
Since those who put their trust in God,
Almighty God will not disown.

Some study the Korán, whilst others the Púráns believe
But both contain false doctrines, which tho' subtle can't deceive.
My friends, why will ye not believe?
And thus secure your happiness
Not now, but in eternity?
I will not plait my hair, nor put rings in my ears,
But silently bend my knee to God all-powerful,
I will not drop my eyelids in mock humility,
For God, who is good and just, hates hypocrisy,
Those who love God, hate the thing which is false,
Be ye sure, that God despiseth the vain.
A selfish man cannot enter heaven,
Nor one, absorbed in worldly matters,
God cannot bear deceitfulness and pride,
If you abandon God to seek for worldly praise
God will close upon you the gates of paradise.
Those who preach vain things and pride
Themselves on gaining converts,
Who point to empty forms, which
Do not conduct to heaven,
Shall themselves be condemned
To God's everlasting wrath.

The author's declarations :—

1. I will preach that, which God himself hath revealed to me.
2. They who worship God, shall hereafter inherit heaven.
3. Doubt not. The true worshipper is as much associated with God
4. As the white curling waves, are a part and portion of the ocean ;
5. Those who talk idly and wildly, are distinct from God.
6. God dwells not in the Véds, nor in the Korán, but in the hearts of such as love him.
7. Those who teach pride, and mock humility will receive the punishment of error.
8. Those who journey blindfold cannot see the way to heaven.
9. A sound understanding cannot contemplate a false doctrine.
10. The eloquent tongue cannot tell of the loving kindness of God, which is only to be *felt* in the hearts of those who love him.

Chapter VII.

Of the Writer's Origin.

My father travelled eastward, and performed pilgrimages. When he reached the confluence of the three rivers,* he occupied his time in making religious offerings. I first saw the light after we had come to Patna, but thence I was removed to Mádradesh, where I was carefully nursed, attended to, and strictly educated. By the time I became intelligent, my father was called away to heaven.

Chapter VIII.

I succeeded to my inheritance, and commenced teaching the word to the best of my abilities, amusing my leisure hours, by pursuing all kinds of sports, I slew many bears, stags, &c. &c. My dwelling was at the city of Páwalá or Náhan, the river flowed close to it, and I revelled in many enjoyments. I killed lions, wolves, and deer of many kinds.

At this time, the emperor Futteh Sháh without a cause picked a quarrel with me. He assailed me, but Sháh Sangrám and five chieftains prepared to do battle on my side, these were Jítmall, and Guláb

* त्रिवेणी Prisg.

Gázi, who were pleased at the prospect of fighting; Mahes Cháñd, and Gangá Rám who had vanquished large armies, and Lall Cháñd, who could tame the fury of a tiger. Diorám also, the chief of his tribe, was wroth to desperation, he fought with the skill of Dron.† Then there was the fiery Kripál, who with his battle-axe slew the brave Khán Hyát, and scattered the legions, as it is fabled that Krishn broke the butter churn. There also, raged the violent Nand Cháñd, who hurled his javelin, then drew forth his sword, the blade of which breaking, he fought at close quarters with his dagger, sustaining the hereditary fame of his race.

My uncle Kripál the Chhettri enraged, contended most furiously, and even when he was wounded by an arrow he overthrew many of the Muhammadan host.

The valiant Chhettri Sahéb Chañd slew the redoubted lord of Khorásan, and our soldiers fought so fiercely, that the enemy fled for his life.

Where Sháh Sangrám made his attack many Musalmáns bit the dust, and the dread Gopál single-handed spread consternation, as doth a tiger amidst a herd of antelopes.

There too, thundered Hari Chand amidst the throng, though an enemy he stood his ground manfully, and fired his arrows swiftly; they went right through all whom they struck.

Aye! Hari Chañd was a stout warrior, his aim was as true as his heart, he slew many soldiers, weapons clashed together, and mighty heroes strewed the ensanguined field.

Jit Mall at length wounded Hari Chand in the breast, with a spear, he fell to the earth, wounds only increased the fury of the combatants; still they urged their coursers forward, and dying went to heaven.

Kúli Khán of Khorasán came forth, and dealt his blows so rapidly, that sparks flew about like as from a blacksmith's anvil. Wild beasts glutted themselves and gloried in the carnage.

How far shall I extend the narrative of this dreadful battle? thousands fought and were slain, a few only remained to tell the tale. The Rájás of Jaswál and Dadevál surrounded the Sháh, with their crippled bands; they fled for safety to the neighbouring hills.

* द्रोण: The military preceptor of the Pándavs.

Hari Cháñd of the tribe of Chandál arose faint with the loss of blood. He scorned flight but urged by fidelity to his royal master, grasped his spear and struggled to the last; this mighty warrior was hacked to pieces.

At one time he nearly disabled me, an arrow from his bow, killed my horse, another whizzed past close to my ear, and a third, striking the metal clasp of my sword belt went through it, grazed my skin, but injured me no further. God preserved the life of his servant.

Alas! Nijábat Khán slew Sháh Sangrám whom many Musalmáns had in vain tried to kill. Sangrám's soul went to heaven, but ere it winged it's flight thitherward, the dying hero, dealt one parting blow which slew his slayer. The world sorrowed for his loss but heaven rejoiced.

Thus the mighty host which opposed me was overthrown and fled; the will of God prevailed, and I returned from the field, singing the song of triumph. I scattered rewards profusely, amongst my soldiers, but did not remain on the spot where I was victorious, proceeding to the country of Káhálúr I founded the city of A'nandpura.

I expelled all from my city who refused to fight in my cause, but my soldiers were protected and caressed. I abode for a long time at A'nandpura, encouraging the good and punishing the refractory and vicious, who were hung up like dogs.

Chapter IX.

I had remained thus peaceably for many months, when Meäh Kháu went to Jammú, at the same time Alif Khán marched to Nadoun, where he declared war with Bhím Chánd, who invited me to assist him, and himself went forth to give battle.

He built a stockade, and filled it with matchlockmen and bowmen. Besides the great Bhím Cháñd the chiefs Rám Sing, Súkh deo Gázi and the Rájá of Jasrót prepared for the fight. Also Prithi Cháñd the prince of Dadwál and Kripál, these for sometime withstood the attack of the enemy, but at length were driven down the hill, the foe beating his war-drums and shouting vehemently.

Then Bhím Cháñd waxed wrath, he chanted aloud the prowess of Hanúmán, and marshalling all his warriors, whose numbers were

increased by myself, he formed us into close column and charged. We dashed into the enemy like a fierce whirlwind.

Enraged was Kripál,
The beasts rejoiced,
Music resounded,
Shrill was the horn's blast.
The youthful were slain,
And swords were clashing,
Hearts burnt with anger,
Swift flew the arrows,
Wounding the dauntless,
They fell on the earth,
Like hail in a storm!

The furious Kripál stood his ground firmly,
His arrows, made the bravest bite the dust,
Great chiefs and their vassals were slaughter'd
History, recorded this great battle.

The Siñhs, infuriate, pressed forward with eagerness and closed with the enemy, Nágúls, Págúls and Darólis, emulating each other. The gallant Diál too, strove to sustain the fame of the Bijrawálís.

Worm that I am! I fired off my matchlock and the bullet consigned a mighty prince to his rest, who in the agonies of death, still gave the war cry—"Kill, Kill." I then fired four arrows in succession to the right, and three to the left. I know not if they told or not, but it pleased God to arrest the slaughter.

The enemy fled, and we encamped on the field of battle, which was red with blood, and covered with the dead. Night came silently on, when nearly half of it had passed, the sounds of the enemy's mournful Nakkárás disturbed the stillness, as he continued his retreat.

At length the bright dawn of day enabled us to pursue, but Alif Khán was in full flight, he lingered not even to break his fast, and his fatigued army straggled after him without daring to halt.

For eight days we encamped on the banks of a river, and I visited the tents of the most influential amongst the Rájás, having agreed to be always their ally. I returned to my home, plundering the town of Alsón in my way, whose inhabitants were afraid to join our army, and I rested in comfort at Ánandpúra.

Chapter X.

The Battle of Nadoun.

For some years my tranquillity remained undisturbed and I employed myself in improving my city, and regulating the morals of its inhabitants.

At length one Diláwar Khán came, and sent his son to me, as if on a friendly message, but himself at the head of an army, treacherously attacked me.

When the enemy was crossing the river the noise of the splashing awoke every one. Álam Siñh came and roused me, and my soldiers ran to their arms with alacrity.

Warlike instruments of every kind bellowed defiance and enmity, and my army hurried to the banks of the river, which though an ocean of kindness, gave the enemy such a cold reception, that he was benumbed in the attempt to cross it.

Frightened at the unexpected opposition when a surprize was intended, the Musalmáns fled without firing a shot, the cowards retreated without striking a blow. Many of them were slain, the rest, noiselessly returned their swords to their scabbards, and sneaked away ashamed, in the darkness of night to their wives.

God protected me and the efforts of the enemy were unavailing, he retreated, plundered and destroyed Barwá "en route" and encamped at Bhúlau. He could not injure me, so satisfied himself with wreaking his vengeance on Barwá, as Bunnyas* who dare not eat meat, pretend to be nourished with pebbles!

Chapter XI.

Alif Khán went to his father, but not being able to give a good account of his flight, he stood abashed, then his father Hussein Khán slapping his arms† addressed his chieftains loudly. They prepared themselves for battle. Hussein Khán headed his army, and encouraged his soldiers with his presence. He first of all plundered the Awáns,

* Hindus of a particular caste, who are not allowed to eat meat, put pebbles with their curry mussálá, which they suck and spit out, fancying their appetites are appeased.

† As wrestlers, before they begin to wrestle.

then overcame the people of Dúdwál and made the Rájpúts slaves; afterwards he devastated the valleys and no one attempted to check his progress. He distributed the plunder amongst his soldiers. For several days he laid waste the districts through which he marched, so that the intimidated Gúlaris contemplated suing for a treaty, as Hussein Khán approached their frontier, but God frustrated their schemes.

Rám Siñh accompanied the Gúlaris to treat with the enemy. They parleyed for several hours, when as the sand which is heated by the sun attributes the warmth to its own nature, denying the power whence it derived it, so, the lower orders of the Mohammedan host fancied themselves brave from the noble bearing of the Sikh emissaries who surrounded them. The slaves were inflated, and looked upon the Sikhs with contempt.

They gulled themselves into believing that the Gúláris, the Kalúris, the Katóches were not equal to themselves. When the Gúláris laid out their presents, these dogs scrambled to seize them, and disputes arising, the Gúláris collecting their treasures, departed to a distance.

Avarice then prevailed over the minds of these Musalmán reptiles, losing all discretion, they began beating to arms. Instantly all was confusion, as when a tiger threatens a herd of deer. For fifteen hours they surrounded the emissaries and prevented them from eating.

In the meantime, the Sikh army incensed at the treatmeat, to which their ambassadors were subjected, sent some chiefs to expostulate, but the Patháns, puffed out with conceit, refused to listen to them, they said—"Give us up your treasures, or prepare to die."

Upon this Sangat Siñh begged of Gopál Siñh who was on the Musalmáns' side, to make peace between them, but his words were utterly disregarded, consequently it was resolved to seize Gopál as an hostage, pending the settlement of negotiations. That chief, however, overheard the plot, which was forming against him, and hurriedly departed to his clan.

Kripál was kindled with wrath, and decided upon fighting. Himmat Hússein, and the youthful Júmmá, ordered the war-drums to be sounded. In an instant horses began to prance, matches were lighted, and triggers tried, to see if they acted freely. Then began deadly strife, all was confusion. Combatants shouting, blows resounding,

matchlocks thundering, trumpets shrieking, elephants screaming, and all the savage din of desperate war.

Bodies charged bodies, and the mens' eyes were red with fury and hatred. Kripál led the van; one spirit animated all, the spirit of destruction: one continued shout rent the air, the shout of "Death, death."

The Katóch Rájá of Kángrá rushed to the fray, as a lion springs upon its prey. Whenever the Chettris discharged their arrows, horses with empty saddles scoured the plain.

Kripál and Gopál met, and tore each other to pieces. One Hari Siñh though mortally wounded, killed several before he died.

Himmat-Kimmat, and Julál Khán, with his terrible battle-axe, stood their ground and fought with desperate valor. At this juncture the Rájá of Jaswál putting his horse into a gallop, rode at Hussein Kháu, and stabbed him with a spear, but like a wounded boar, he only fought the fiercer.

If a soldier were struck, he thought it a compliment, and strove to return it. The disputed field was soon covered with the carcases of the dead, and groans filled the air. A river of blood flowed, and the jackals slaked their thirst in it.

Hussein Khán faint with the loss of blood dismounted from his horse, and the Patháns surrounded him, they contended with fierce but hopeless energy. Mahádev, Brahm, and all the gods must have been roused from their contemplations, the heavenly minstrels sung dirges for the departed warriors, and the celestial dancers jumped with excitement.

Hussein still tried to hold his own, but the soldiers of Jaswál surrounded him, the most skilful attacked him. God willed it, and this brave warrior fell to rise no more; his soul was received in paradise.

When their leader was no more, the confidence of the enemy gave way, and his spirit was broken. Hari Siñh slew many of their principal chiefs; Chandála's Rájá too, plied the work of destruction but Sangat Rai was killed, and his adherents failed not to revenge his death.

Báz Khán and Himmat Khán fled and the followers of Kripál fought hand to hand for their chieftain's body. When Hussein was slain, the Musalmán army sullenly retreated. This mighty host vanished, as

doth the crowd, after the investiture of a Mahant. Thus our enemies were again defeated and we collected and buried our dead, our force remained assembled for a few days, when all necessary arrangements being concluded, we dispersed to our several homes.

God protected me, and amidst this shower of bullets I remained uninjured.

Chapter XII.

I have just told of a great battle at which the leader of the Musalmán army was killed, upon which Rústam Khán and Diláwar Khán sent their ambassadors to us, but rendered wise by experience, and apprehensive of stratagem, we dispatched Jughár Siñh properly supported to receive the embassy.

The treacherous Mohammedans attacked Júghár Siñh at the town of Bhúlau, who drove them from the town, and took up a strong position which at early dawn on the following morning, the worthless Gaj Siñh who sided with the enemy, threatened, but in vain, for assisted by Hádár Siñh, the force of Júghár Siñh held its ground, and was as immovable as a pillar whose foundation is buried deep in the earth. Hádár Siñh was wounded, and re-inforcements joined both armies.

Chandál Khán commanded the Mohammedan troops, and Jasmál Siñh, our army; animated by these brave leaders both sides fought like lions, and paradise being the portion of all who fall in the battle-field, the soldiers disregarded death.

In the midst of this dire conflict, Chánd Naráyan was killed. He was the friend and companion of Júghár Siñh, who lamenting his death, resolved to revenge it, and advanced singly. The enemy surrounded this brave man, he kept him at bay, and slew many soldiers, but numbers prevailed, pierced with a thousand arrows, he fell.

Chapter XIII.

Júghár Siñh died, and I returned to my home.

Then the powerful Aurangzéb became envious of my fame, he sent his son into the Panjáb, at the head of a large army. Many of my people dreading the approach of the emperor's own son went to hide

themselves in the neighbouring hills. Some tried to intimidate me, but they knew not the intentions of God.

Several left the happy city of Ánandpúra to take shelter in the high hills, the cowards were greatly alarmed and fancied there was safety in flight; but the emperor had all these deserters ferreted out and they were destroyed.

Those who forsake their Gúrú, will have no
Resting place in this, nor in the next world.
On earth they are despised, in heaven
Rejected. Their case is a hopeless one.
For, they are as it were, always hungry
And in need. Such as leave the company
Of holy men, are useless in this world,
And damned eternally in the next.
The selfish world for which they live, scorns them.
Yes! those who leave their Gúrú are disgraced,
Their children do not thrive, but die, cursing
Their parents.
Those who laugh at the words of their Gúrú
Perish like dogs and gnash their teeth in hell,
God created Hindu and Musalmán,
Let both then follow their respective creeds.
Do Musalmáns respect those who forsake
Their own creed, to follow Mohammed's faith?
No! they despise, ill treat and plunder them.
Apostacy, never can be esteemed!
Miserable apostate! he returns
And wretched, seeks assistance from the Sikhs,
Compassionate they help him. What then?
His new found teachers, plunder him of all!
Wretched apostates! the clouds of error
Float away, and willingly, they would return
Unto their Gúrú, but he indignant,
Offended, hides his countenance from them,
They find him not, but go from whence they came,
Their labor all in vain. No Gúrú here.
No heaven hereafter. Hopeless their lot!

But those who love the Gúrú never feel
Adversity. "Riches and plenteousness
Shall be in their houses." Sin and evil
Can never assail them. They need no help
From Moslems, plenty is beneath their roofs.
If labour be their portion upon earth,
A happy conscience, softens all their toil.

He was called Mirzá Bég who destroyed the dwellings of those who fled from Anandpúra. Those who remained were safe, for the enemy never ventured to approach their thresholds. Those who deserted me, and bowed in subserviency to the Musalmán were treated with contempt, their faces were besmeared with filth and they were shaved. They looked like faqirs begging for alms.

Children pretending to be their converts, pelted them with stones. Their heads were thrust into bags, like asses to be fed with malidá.* Their foreheads were bruised with shoe-nails, and looked as if covered with the brahmanical wafer. Boys pelted filth at them, crying out the while, "Here are alms for you."

Such is the punishment of apostacy, but it is not so bad as the crime.

Those who have never fought in battles nor achieved any great action, live unknown, and die unremembered.

To know and to worship God, to respect and believe the words of his Gúrú, this is to achieve a great action.

The good never feel adversity. God reconciles them to it. Who can injure whom God protects? No one! No plots can harm him! He laughs at the designs of his enemies!

Trusting in the power of God, he knows that he is as well protected as the tongue in his mouth.

Chapter XIV.

Kál, loveth and protecteth all good men,
And averteth from them evil.
Those who worship him behold his power,
Those who serve him, share his mercy.

* Mashed vetches boiled.

True believers escape sad misfortunes,
Kál overpowers all their foes.
Kál, well knowing me to be his servant,
Hath honored and exalted me.
I acknowledge God, to be our father,
As a mother, nurseth her child.
The power of Kál hath sustained me,
My heart is my only Gúrú.
When inspiration lent me support,
I spoke, not of my own accord.
Great Kál, imparted to me his wisdom,
Without which my efforts were vain.
I was no one, when God first noticed me,
I was great by His selection.
Listen then, all ye children of the earth,
For my tenets are from above.

Report on the Túran Mall Hill, addressed to R. N. C. HAMILTON, *Esquire, Resident at Indore. By* CAPTAIN HAY, *Asst. to the Resident.*

Túran Mall, a hill in Candesh and one of the Satpurá range lies in about 21° 52′ N. Latitude and 74° 34′ East Longitude. It is about 15 miles in an easterly direction from Dhergaum, 10 or 12 south from Badael (near the mouth of the Turkul river) on the Nerbudda; 20 miles north from Sultánpura in Candesh, and 33 or 34 miles S. W. from Chiculda, on the Nerbudda. Its summit is to be gained from all of these above named places, but for the European traveller, the Chiculda and Sooltanpura or Sydah routes are the only practicable ones. From Chiculda the measured road or rather timber track is 43 miles in length and with the exception of the Tírápáni Ghaut (some 10 miles from the Túran Mall Lake) no difficulties of any moment are to be surmounted. Here the ascent for a mile and a quarter, is very great, being about 1 in 2½, and taxes the energy of man and beast to the utmost. However, it is capable of great improvement and with a little labor and money expended might be made comparatively easy. At

present no camels can be taken further than the Bokrata jungle, which is at the foot of this ghaut. Bullocks and ponies must be solely relied upon as beasts of burthen. The route from Candesh viâ Sydah and Sultánpura is far more difficult of ascent than the foregoing, and beasts of burthen proceeding by this road, must be very lightly laden. The paths leading towards Dhergaum and Baduël are only passable for travellers on foot. Turan Mall seems to be about the highest of the hills in the Sátpúra range, perhaps the Herass Hill in the Barwání state excepted, which may be a few hundred feet higher, but which again has not the advantage of water on its summit. Turan Mall obtains its name from the tree (Zizyphus albens) called in Sanscrit "Turan" being so common there, and the adjunct "Mall" I believe to be a word in use with certain Bheels, to designate any high or table land. By barometrical measurement the highest point of Turan Mall (a small hill on its eastern side) attains an altitude of 3373 feet; the banks of the lake being 265 feet below this. This lake is one of the most attractive spots on Turan Mall, situated on the southern end, the traveller from the Nerbudda has to pass over the whole length of the hill ere he reaches it. It is about one mile and six furlongs in circumference and 650 yards in breadth, of great depth, being fathomed in the centre and found to be 34½ feet deep. It is formed by the artificial obstruction of the gorge betwixt two small hills. At one end of this embankment there is a passage for the waters of the periodical rains, which are carried off towards a smaller lake, a few hundred yards from the large one, and about 30 feet under its level. The flooded waters of these two lakes are carried off to the Sítâ Kúnd, a precipice varying from 400 to 500 feet in height. At the water-fall, the first fall by measurement is 243 feet in height, being perpendicular without let or hindrance. The view at this place in the monsoon, during a flood must be grand indeed, for the waters from the lakes and what is received in transit, must make a very considerable volume.

The jungles about the hill contain many varieties of trees and shrubs which are not to be met with in Nimar or Málwá. To the botanist the field here opened to his research would be most attractive and entertaining. The edible fruits generally met with and not common to the plains are those of the Turan (Zizyphus albens); Chironji (Chirongia sapida); kutaie, a small red berry; sengul; sasil; the wild

mango, and the wild plantain. The roots also of a tree resembling the plantain called by the Bheels "kaiel kanda" are also used for food. In common with the lowlands, the fruit trees are numerous: a few may be enumerated, such as the jamun (Eugenia jambolana); amru (Philanthus emblica); the tendu or bastard ebony; the several species of Indian Ficus; the baër or jujube tree; the mowá or broad-leaved Bassia; the imli or tamarind; and the karondá (Carissa carondas). The gum trees are the "sale" (Boswellia thurifera) producing olibanum; the dhaowra, kurík, khaire, and the bhijá, the last used medicinally. Besides the above there are many trees and shrubs novel to the resident of the plains and called by the natives, the sewrun, bearing a red flower; the madul; gundáli (Pæderia fœtida); sajri; kerow, said to flower only once in 12 years; manja (berries used for intoxicating fish); gúndi (Cordia myxa) used as a pickle; kinjí, the seeds giving an oil which is used medicinally; kúmrí; phasi; siõn; mokhá (red nightshade) having edible leaves; amultás (Cassia fistula), the kherowlá, with yellow flowers similar to the amultas; kharnag with long pendant seed pods like the amultás; and the khankar, the fruit of which is used for pickles.

Creepers also are numerous, and almost every tree has its parasite. The hill colocynth (C. Hardwickii) or ruhori indragam is not uncommon; as also the pawri, growing in a wild state. Here also the grasses grow most luxuriantly; the rusá grass so noted for the oil extracted from it being most abundant. The trees used for building purposes are very diversified. The principal ones are the teak; tendu or ebony; jamun; dhamni, or bastard lance; sag; kusum, on which the lac insect is found; the toon; sirsa; bhati sisam, kulum; anjun; kear, and the tunch or tausa, the wood of which is particularly hard and tough.

The geological formation of the Turan Mall hill and those in its vicinity is uniformly of trap and basalt with a red clay, evidently containing iron. The summit of the hill is irregular having low hills of 100 and 150 feet high rising in different places from the general elevation of the plateau which altogether may include an area of 16 square miles. Table-lands are to be met with in several spots; but are not of great extent. The height of the ulterior ridge which is on almost all sides precipitous and perpendicular may average 400 feet from the

debris of the fallen rocks in the valleys below. The fissures in this ridge are very deep and irregular and bear the impress of a mighty convulsion of nature having occurred in ages past.

The summit of Turan Mall is interspersed with remains of numerous temples and walls. The latter have evidently been built merely for protection from external foes, and extend for miles in all directions, but are chiefly to be seen at points where nature required the aid of art to make the hill impregnable. The temples having been built with loose stones and no cement or mortar of any description used in their erection, have consequently during the course of years, made but a slight resistance to the force of the elements and their sites are now to the unobservant eye, hardly distinguishable from the ground which surrounds them. The earthen embankment or bund on the eastern side of the lake, measuring some 460 yards long, and faced with stone, is remarkable for its solidity, which cannot be less than 170 or 200 feet at its base with a height of 40 feet. The labour expended upon it must have been immense and this work would alone draw our attention and wonder as to the means and power of the individual who could execute, as well as devise, such an undertaking. Nothing approximating to certainty, can be said as to the ancient history of Turan Mall. What the natives say regarding it, is puerile in the extreme and unworthy of notice. The evidences of a former numerous population are plain enough, but not a vestige of an inscription remains to guide one in his researches. On the south side of the hill in a small artificial cave about 12 feet square an image of Párswanáth is to be seen. At this cave a small annual mela or fair is held in October. Besides this, there are other and numerous sculptured evidences of the Jaina religion to be found by the sites of ruined temples; but they again have seemingly in places been appropriated by the followers of the Brahmanical faith at a later date as stones to form the wall of their own temples. One of the approaches to Turan Mall is through the wall on the S. E. side. This has been named the "Arawassa" Durnaza. What the derivation of "Ara" may be, I am at a loss to conjecture; "wassa" may be but a corruption of the Sanscrit word "basa" a dwelling or residence. The inhabitants of this portion of the Sátpura range are mostly Bheels and Paurias. The first are distinguished under several castes and denominations, numbering, I believe, upwards of 84.

The Bheels residing on Turan Mall boast of being descended from a Rajpoot ancestry, and style themselves "Simlí." Altogether there are not more than 40 families located on the hill, and their huts are dispersed far and wide in all directions. They do not bear any general peculiarity of features in their physiognomy, and I have noticed that, saving perhaps the bearing and impress of a persecuted race, there is nothing to distinguish them from the men of the plains. They are slight and spare in their limbs and body, but this only conduces to that great power which they all have in common of undergoing fatigue and exertion when called upon to do so. With all this endurance they have a thorough contempt and dislike to labour as understood by us. Gaining at best but a precarious subsistence from the fruits of the jungle the generality of Bheels do not interdict themselves from any description of animal food when they have it in their power to indulge in it, and the flesh of the cow, buffalo, sheep, goat, boar and deer are equally prized. Their religion is generally of a most simple and primitive description, I remark generally, as their notions on such subjects are variable and not imbued with any deep feeling. The chief deities worshipped on Turan Mall are named, Sudal Deo, Kúmbeh Deo, Mamnia Danip and Goracknáth. The first is invoked in conjunction with the sun and moon, and is supposed to have the elements under his control. Kúmbeh Deo is worshipped at the Dewáli and may be another form of Kálí, Mamnia Dunip is evidently the "Ceres" of these mountaineers. The first fruits of the season are offered at her shrine, and she is the dispenser of the bounties of mother earth. Gorucknath is a deity of the Hindus and, I fancy, lately introduced. His devotees are not numerous amongst the Bheels, who are rather lukewarm in his adoration.

The customs pertaining to the three great events in a man's existence are very simple and void of display. On the birth of a child, his or her advent into the world is not ushered in by any loud acclamations or discharge of fire-arms so common to the inhabitants of India. The father merely collecting a few friends together, over the discussion of a jar of spirits, mentions the name by which he wishes his child to be designated. When a Bheel is desirous of joining himself to the object of his regard and no objections are shown by the family of the girl, the friends of the engaging parties are called to witness the ceremony

and forms of marriage, which are continued during the space of three days. On the first day the friends of each are feasted at the houses of the respective parents, where the spirit distilled from the flower of the mowa tree adds not a little to the hilarity of the guests. On the second day the friends of the young couple take them on separate occasions to the foot of a tree called "singa" which is considered sacred and where certain ceremonies of worship are gone through. On their return from devotion, the senior of the party taking a little liquor in a brass vessel makes an oblation to the earth, in the name of either the bride or bridegroom, as the case may be, and then their bodies, feet and hands are smeared over with turmeric. As yet the family of the bridegroom has not visited the bride, but on the evening of the second day the members of it accompanied by their friends in a body come before the house of the bride where they are met by her relations and a preconcerted struggle takes place to break a bamboo previously provided, one party pulling against the other. On this being accomplished, certain omens are prognosticated from the fracture in the bamboo. The evening closes over the mirth and enjoyment of the assemblage. On the morning of the third day the female relations of the bridegroom make a forcible entry into the bride's house and take her to their own habitation *vi et armis*, which when happily accomplished the marriage rites are supposed to be finished and friends disperse to their several avocations. A wife generally costs upwards of 20 rupees; if the lover is not possessed with worldly gear to that amount he must contract, like Jacob of old, to labour for his father-in-law a stipulated period which may vary from 2 to 5 years. On the death of a Bheel, his nearest relations collect his cooking utensils, his axe, bow and arrows and taking them with the body, burn the latter. In this ceremony they are joined by their friends who after the funeral rites are finished, collect at the house of the deceased to sympathize and condole with the relatives. A period of several days having elapsed the nearest of kin cooks some rice, and having put it into two separate platters in the name of the deceased, leaves one on the place where the body was burnt and the other before the threshold of his late dwelling. This is intended as provision for the spirit who is considered to be still roaming about. No other rites are followed. Cremation is not resorted to with the bodies of women and infants, they are simply buried and a

cairn of stones heaped over the grave; a custom which has been handed down to them from their ancestors, but as to the purport of such singularity, in making a difference, betwixt the obsequies of the two sexes, they profess ignorance. Believing in the transmigration of souls, they are besides, and perhaps in consequence, much given to superstitious reliance in omens derived from animals and birds.

During the period of my stay at Turan Mall, I had every reason to judge favorably of its climate. The accompanying meteorological observations will show a mean maximum of temperature of 85.47 for the month of May; which is particularly low, for the altitude attained. To account for this it must be taken into consideration that several causes are brought into play; the proximity of a large lake, the evaporation from which extending over a superficies of upwards of 120 square acres must be very great; adjoining forests, which are known always to conduce to decreased temperature; the soil which being of a plastic and attractive nature will also materially aid to lower the range of the thermometer.

Above the influence of the hot winds Turan Mall is visited for the greater part of the year by strong and steady winds from the W. and S. W. quarters, which evidently coming from the ocean (distant about 100 miles) and carrying along with them a great amount of moisture, add much to the agreeable sensation of the atmosphere, which to the feelings, seems always to be of a temperature lower than that indicated by the thermometer. Every thing on the hill tends to prove a temperate climate. The stranger is first attracted by the greenness and freshness of the trees and shrubs, and the grass which where it has been burnt, will even in May, the hottest month of the year, throw out during the course of a few days, new shoots: and this not after any fall of rain, but from the moisture naturally in the soil nourishing the roots. Turan Mall, however, with all the benefits which might be derived from a residence on it will not, I am afraid, bear a close comparison to the sanatarium in the Mahábaleshwar hills which has a general temperature of 5 degrees or so lower than that of the place now under discussion. In the equability of climate I doubt if there is much difference. The annual mean of daily variation at Mahábáleshwar being nearly 10° and that of Turan Mall merely in the hottest month of the year not exceeding 15.33. For May the power of the

sun's rays is equal to 30° 12′, which I have not the means of comparing with Mahábáleshwar, but which, I doubt not will, not exceed it very much if at all. The hill is very subject to thunder storms, with great falls of rain, and I have been informed by its inhabitants that during the monsoon such is the intensity of the rain, that for days prominent objects within a few yards of their huts are entirely concealed from view. Of this I had demonstration, for though on the two occasions specified in the register of observations, rain did not fall for any length of time, nevertheless a few hours sufficed to indicate a fall of 12.5 inches. The cold season is said to be particularly severe; and frost of common occurrence. The Bheels state that the sides of the lakes have been repeatedly frozen, and on a late occasion the smaller lake (which may be 150 yards long and 100 broad) was almost completely frozen over. Amongst the natives, disease occurs but seldom; with the exception of slight fevers (easily reduced by their own simple treatment) and dysentery after the rains, there is nothing else to give one reason to believe that Turan Mall is visited by any epidemic. The months most desirable for a residence on the hill, would be April and May. Previous to the latter part of April, I am not inclined to suppose that the disparity in the climate of the place and that of the plains is so great as to cause much benefit to an invalid seeking change of air. As a sanatarium, perhaps, the hill does not boast of such a climate as would lead one to believe that an invalid far advanced in disease would receive much good from a trip to it. Nevertheless to one not already prostrated from illness, but whose ailments only require a change of air and scene, I believe few places would afford a more agreeable retreat. As a sanatory station to European soldiers Turan Mall has many objections. The most conclusive being the difficulty with which it is reached; the extent of jungle which is to be traversed, the enhanced cost of provisions which might be expected consequent on bad rains, Sydah being the nearest market, and the limited period of time to be passed on the hill, the severe rainy season precluding any hopes of its being a fit habitation for invalids during the prevalence of the monsoon. As compared with Nimar the range of the thermometer shews a most gratifying result. For the month of May at

Mundlasir, the max. was, ..	104°.	Turun Mall, the max. was,	85.47
Ditto..... mean.....	93.5	Ditto.... mean	77.78
Ditto..... minimum ..	83.	Ditto.... minimum ..	70.14

thus showing a difference of more than 18½ degrees in favor of the latter. Mundlasir is considered to be in general about 7 degrees higher in temperature than Mhow and Indore in Malwa.

In conclusion I would remark that people desirous of making a trial of the climate of Turan Mall would do wisely, if they made arrangements for supplies for themselves and retainers to be procured from time to time on the Nimar side at Chiculda and Barwáni and on the Candesh at Sydah (6 miles north of the Tapti) and the adjoining villages. They must come provided with every thing, as the Bheels living on the hill grow grain and other produce merely for their own limited consumption. If a prolonged stay is anticipated, it would be advisable that they be accompanied by a carpenter or two and a few thatchers for the purpose of erecting a more substantial habitation than that afforded by canvas. The Bheels inhabiting the hill with management will be always found ready to work for the European stranger; but with the exception of cutting down and collecting timber, bamboos and grass and the making of a very substantial description of rope from the bark of the unjan tree, nothing more can be expected from them. Their great incentives to exertion seem to be arrack and tobacco; with a due and cautious application of these luxuries, in addition to the just hire of their labour, difficulties vanish. Should the visitors to the hill be sportsmen, I am afraid they will not find many attractions on the summit; but in the surrounding jungles, the jungle fowl is very common and the wild buffalo with all the descriptions of large game usually found in the plains are numerous enough. From Nassick, officers are in the habit of going to Vujuneer; and from Dhoolia and Malligaum, to Sapt-Sing for the hot season. The difficulties to be surmounted in reaching Turan Mall, I have been informed are not greater than what are every year undergone by the gentlemen visiting for health and recreation the above-named hills.

Route from Sydáh, on the Gumti, in Candeish, to the Turan Mall Hill.

Territory.	Names of Places.	Distances Miles.	Remarks.
British.	Sydáh (16 miles North of the Taptí,) ..	..	On the Gumti River, a considerable town. The residence of the Súltánpúra Mámlatdár. Supplies abundant.
Ditto.	Sultánpúra, ...	8 m.	Formerly a large town, now totally in ruins, with a Fort and the remains of good houses. Beautiful trees and a small river.
Ditto.	Haldiä, ...	12 m.	At 2 miles distance from Sultánpúra pass Tulwaee, formerly a Ryut village, now inhabited by Bheels. 8 miles further on, cross the Kamti Utar a small river. After which the ascents commence. 2 miles from the river reach a place called Haldiä, being a deep Khoond, but no village. Water abundant.
Ditto.	Turan Mall (Lake),	10½ m.	6 miles from last halting ground pass a small Bheel village called Sukaljeri, and 3 miles further on Kálápání, where formerly a few Bheels resided. The road is tolerable to Sukaljeri, thence a steep ascent succeeded by several sharp pitches, and one descent to Kálápáni. From Kálápáni to Turan Mall ½ a mile the ascent is very steep. On reaching the summit of the hill the road to the lake is over level ground.

Route from Chiculda, on the Nerbudda to the Turan Mall Hill, in Candesh.

Territory.	Names of Stages.	Distance. M.	Distance. F.	Remarks.
Holkar.	Chiculda,..	0	0	A considerable village on the right bank of the Nerbudda. Supplies scanty but procurable at Barwani 4 miles distant. At Chiculda there is a Bungalow.
Barwani.	Gohi River,	17	4	Encamping ground on the left bank of the stream and about half a mile to the east of a few Bheel huts. The place called Kosba and the residence of a Bheel naick by name Dowla. From Chiculda the road for 6 miles lies nearly due west and along the banks of the Nerbudda through the villages of Pendra, Nandgáon, Pichowri and Sandúl 8 miles 1 furlong, from Chiculda the Gohi Naddi is first crossed at a place called Bambta, where 2 or 3 Bheel families have erected their huts, a few hundred yards further on, it is crossed a second time, and 3 miles from Bambta a third time. 4 miles from Bambta a rather steep Ghaut is met with, and 5 miles 3 fur. from this Ghaut the encamping ground is reached. For the first 8 or 9 miles from Chiculda, there is a road for hackries though not a very well defined one. Beyond this the tree jungle is attained, and the road gradually dwindles down into a mere timber track.
Barwani.	Bokrata, ..	13	2	The name of the jungle where it is usual for travellers proceeding to Turan Mall to make a halt. The encamping ground is in a thick grove of Bambús on the bank of a small Nalláh, affording water throughout the year. No Bheel huts are to be found for several miles round. 4 miles from the Gohi Naddi there is a small Ghaut. 4 miles 1 fur. further on the Dákú Nalláh is reached and the road lies for several hundred yards along its bed. From the Dákú Nalláh to encamping ground is a distance of 5 miles 2 fur. The ascent from the Gohi Naddi to Bokrata is very gradual though the latter place is 2015 feet above the level of the sea and 1342 higher than the Gohi Naddi.
British.	Turan Mall (Lake),..	12	3½	From Bokrata to the foot of the Jeerar Ghaut 2½ miles, the road lies along the course of a small Nalláh, very stony and troublesome for loaded animals. From the bottom of the Jerar Ghaut to the summit is 1 mile 3 fur., the ascent being very difficult and steep. 1 mile 1 fur. from the top of the Ghaut a few Bheel huts are passed and a small spring is reached. Further on 1 mile 6 fur. the Turan Mall Ghaut is reached, but it is comparatively easy to that of Jera. The top of the Turan Mall Ghaut at the Ara-wassa gate to the lake is a distance of 3 miles 5½ furlongs.

Remarks for the Month of May.

1st.—Wind light, veering to north 10 A. M., but not continuing so for more than an hour, springing up again at 4 P. M.

2nd.—Very calm wind from N. from 10 till 4. P. M. Slight streaked cirri.

3rd.—Wind from W. in morning. S. and S. W. during the day; clouds light flacculent and cirri.

4th.—Wind W. dark cirri.

5th.—Light wind from W. in morning, variable in afternoon and in gusts from N. and N. E.; clear in the morning, dark cirri in afternoon.

6th.—Wind very variable throughout the day, N. and N. E. in afternoon, settling to W., strong breeze from W. all night; sun obscured all day, cirro cumuli general.

7th.—Cirro cum. general; a strong breeze at sunrise from S. W. which continued till noon, sun obscured for greater part of the day.

8th.—Cir. cum. general; at sunrise a strong breeze continuing till 10 A. M.; sun dim and obscured.

9th.—Clear throughout the day with the exception of slight cir. cum. at sunrise.

10th.—Clear throughout the day, a few light flacculent fog clouds at sunrise. Heavy dew falling during the night.

11th.—Ditto ditto ditto ditto ditto ditto.

12th.—Strong breeze from the W. blowing at sunrise which gradually veered to the S. W., by noon clear.

13th.—Clear during the morning; cum. stratus visible to the East in the afternoon.

14th.—Ditto ditto ditto ditto ditto.

15th.—A few light flacculent clouds visible on the S. W. horizon, but disappearing by noon.

16th.—Clear morning, forenoon detached cumuli pretty general, disappearing by afternoon.

17th.—A few light cumuli in all directions but disappearing by evening.

18th.—Clear.

19th.—Ditto.

20th.—Ditto.

21st.—Clear.

22nd.—Ditto.

23rd.—Ditto, the sun obscured by cumuli to the West at sunset.

24th.—Ditto about sunrise a small fog cloud visible to the S. W. of the Lake.

25th.—Detached cirro cum. general for the first part of the day. In the afternoon verging to cirrus.

26th.—At sunrise calm with the sun obscured by dense atmosphere a gentle wind rising at 9 A. M. from the W. Suddenly veering at 11 A. M. to the N. E. and E.; blowing at intervals from these quarters during the day; Nimbus accumulating to the E., and a few drops of rain falling at 9 P. M.

27th.—Sun obscured throughout the day. Heavy rain fell shortly after 4 P. M. from the East with a high wind, continued so for 2 hours and then suddenly lulled. Wind changing to the West for a short period about sunset, but veering again to the N. E., at 10 P. M.; a most violent squall with heavy rain blew for 1½ hours from the West, accompanied by thunder and lightning.

28th.—Cloudy, and sun obscured for the greater part of the day; very light and variable winds, at 8 P. M. a great storm of hail and rain, with thunder and lightning from the West, lasting about 1½ hours; winds strong from the West throughout the night.

29th.—Morning cloudy with dense fog and a strong southerly wind but gradually veering round to the West, large masses of cumuli clouds rising and passing over to the East, a clear night.

30th.—Dense fog in the morning with drizzling rain, at times clearing; by noon a succession of cumuli clouds rising from the West throughout the day, but clearing by night.

31st.—Foggy and cloudy in the morning with a high wind from the West. Fog clearing by noon; large masses of cumuli clouds rising from the West and passing over head; a clear night.

Memo. of the means of observations made at Turan Mall, for the month of May, 1851.

Long. 74.34 E. Lat. 21.52 N. Alt. 3208 ft.

Observations made at Sunrise.				Maximum pressure observed at 10 A. M.				Minimum pressure observed at 4 P. M.				Observations made at Sunset.				Observations made at 10 P. M.				Maximum and Minimum Thermometer.			Maximum Therm. in Sun's rays.	
	Temperature.				Temperature.				Temperature.				Temperature.				Temperature.								
Barometer.	Mercury.	Air.	Wet Bulb.	Barometer.	Mercury.	Air.	Wet Bulb.	Barometer.	Mercury.	Air.	Wet Bulb.	Barometer.	Mercury.	Air.	Wet Bulb.	Barometer.	Mercury.	Air.	Wet Bulb.	Maximum.	Mean.	Minimum.	Under glass.	Freely exposed.
26.76	70.22	66.88	63.46	26.80	77.48	76.16	64.77	26.76	86.11	82.43	66.12	26.75	84.45	82.32	65.33	26.74	80.74	77.58	64.82	85.47	77.78	70.14	135.25	115.89

The prevalent winds during the month, from the S. W. and W.

F. A. V. Thuraburn, *Lieut.*

Notice of a collection of Mammalia, Birds, and Reptiles, procured at or near the station of Chérra Punji in the Khásia hills, north of Sylhet.—By E. Blyth, Esq.

For an opportunity of examining a few of the animal inhabitants of the little explored Khásia hills, we are indebted to Mr. R. W. G. Frith, who, during a late visit to Chérra Punji, collected specimens of the following species, which he has brought down either living, preserved in spirit, or their prepared skins.

Mammalia.

Presbytis pileatus, nobis, *J. A. S.*, XII, 174, XIII, 467, XVI, 735. Procured at Cherra Punji.

Dysopus plicatus, (B. Ham.) An example in spirit, nearly as dark-coloured as the Malayan race termed D. tenuis, (Horsfield), which, we think, differs not, otherwise than in being constantly of a much darker hue than the ordinary D. plicatus of India.

Nycticejus ornatus, nobis, *n. s.* A large and robustly formed typical species, of uncommon beauty. In colouring, it is affined to

N. TICKELLI, nobis, p. 157, *ante;* but is altogether stronger, with conspicuously larger and stronger feet, and remarkably elongated ears. It also does not possess the peculiar small flat incisor, situate posteriorly to the contact of the ordinary large upper incisor and the canine, seen in N. TICKELLI. Colour, a bright pale rusty isabelline-brown above, (the piles black for the basal fourth, then whitish, with rusty extremities,) less vivid on the lower half of the back, and somewhat paler below; a pure silky white spot on the centre of the forehead, others on each shoulder and axilla above, and a narrow stripe of the same along the middle of the back; face below the forehead deep brown, including the chin: a broad white demi-collar over the throat from ear to ear; and beneath this is a dark brown demi-collar of similar extent (passing in a narrow streak upward to the chin), and below this again a narrower pure silky white one, commencing from the shoulders—which below it are again deep brown, continued round to separate the ends of the white band below from the white axillary spot above. Membranes marked as in N. TICKELLI, or black except the interfemoral which is tawny-red, as also a portion of the lateral membranes towards the body, and the entire limbs and digits. Ear-conch elongate-oval, erect, with tragus a fourth of its length, narrow, semi-lunate, and curved to the front. Length (of an adult female) $4\frac{3}{4}$ in., of which the tail measures $1\frac{7}{8}$ in.; expanse $14\frac{1}{2}$ in.; fore-arm $2\frac{1}{4}$ in.; longest finger $3\frac{7}{8}$ in.; tibia $\frac{7}{8}$ in.; foot with claws $\frac{1}{2}$ in. Ears externally $\frac{3}{8}$ in.; tragus $\frac{1}{4}$ in. Procured at Chérra Punji.

TALPA LEUCURA, nobis, *J. A. S.* XIX, 215. Of this recently described species, Mr. Frith has brought thirty-three specimens in spirit, all true to the distinctive characters indicated. In none does the head and body exceed $4\frac{1}{2}$ in. in length. The species, however, inhabits the plain of Sylhet, and not Chérra Punji as formerly stated.

SOREX PEYROTETII (?), Duvernoy. A headless specimen, affixed to a thorn by some Shrike, as we have several times observed of the common British Shrew by LANIUS COLLURIO. Colour darker than usual; but otherwise it appears identical with specimens we have seen from various parts, as Almorah, S. India, Maulmein, &c. It is the smallest of all known mammalia.

TUPAIA FERRUGINEA, var. BELANGERI; *Tupaie de Pegu*, Lesson, *Zool. de Belanger*, t. 4; *Cladobates Belangeri*, Wagner. This race,

which abounds in Arakan and the Tenasserim provinces, merely differs from the common T. FERRUGINEA, Raffles, of the Malayan peninsula, in being less deeply tinged (and often not at all so) with maronne on the upper-parts; the colouring being much as in T. JAVANICA, but still having a decided rufous cast as compared with this little species, which likewise is common about Malacca and Singapore, though unnoticed in Dr. Cantor's list of the mammalia of the Malayan peninsula. We cannot regard T. BELANGERI as distinct from T. FERRUGINEA; and we have not previously seen it from so northern a locality as Chérra Punji, though it probably also inhabits Asám. The species of Central and Southern India, T. ELLIOTI, Waterhouse, is a much larger animal, equal in size to T. TANA (v. CLADOBATES SPECIOSUS, Wagner), of the Archipelago; and the only remaining species of this genus hitherto discovered is the strongly marked T. MURINA, (Diard), from the Western Coast of Borneo, figured by Dr. S. Müller and M. Temminck.

RHIZOMYS PRUINOSUS, nobis, *n. s.* So far as can be judged from external characters, this quite resembles RH. BADIUS, Hodgson, of the vicinity of Darjiling, and RH. CASTANEUS, nobis, *J. A. S.* XII, 1007, of Arakan, except in being very differently coloured: the fur being uniformly dusky-slate above and below, with hoary tips, which latter are of somewhat coarser texture; on the belly there is a slight silvery shade. All three differ from RH. SUMATRENSIS (v. *cinereus*, McClelland,) of the Tenasserim provinces and Malayan peninsula, in being much less robust, having a much shorter tail, and a dense coat of fine soft fur instead of a thin coat of bristly fur; but their structural characters are essentially the same. An example of the present race was long ago forwarded to the Society from Chérra Punji by F. Skipwith, Esq., C. S.; but we deferred describing it until seeing additional specimens. Mr. Skipwith's specimen having old and faded fur is much browner and less slaty than those obtained by Mr. Frith in newly renovated pelage; but the hoary tips are conspicuous in all. It is extremely common at Chérra Punji.

ATHERURA MACROURA? (L.; nec *Hystrix fasciculata*, Shaw): *Hystrix spicifera*, Buch. Ham., *MS.* The different Asiatic species of this genus remain to be fully discriminated. Mr. Waterhouse refers the Siamese race, with a terminal tail-tuft of "long flattened

bristles (somewhat resembling thin and narrow strips of whale bone)," to *Hystrix fasciculata*, Shaw (v. *H. macroura*, Gervais), and he states this to inhabit "Siam and the Malayan peninsula." It is doubtless the species figured, eviendtly from life, by Gen. Hardwicke: but, if inhabiting the Malayan peninsula, it must co-exist there with ATH. MACROURA, (L.), apud Waterhouse, which has "the apex of the tail provided with a large tuft of flat bristles, which are spirally twisted, and alternately contracted and expanded." This Mr. Waterhouse gives doubtfully from Sumatra; and it is certainly the common Brush-tailed Porcupine of the Malayan peninsula. In the Chittagong, Tippera, and Khásya hills, there is a very similar race to the last, but with the spines shorter and less coarse, excepting those of the croup, the *ensemble* of the colouring greyer, and the enamel of the front-teeth pale yellow instead of deep buff or orange-yellow. On minute comparison of the skulls, the frontals of the Malayan race are seen to be somewhat larger and more convex, while the parietals are proportionally smaller, than in the Northern race: the palatal foramen, also, is narrower and advances more forward in the former; and the inferior lateral process of the superior maxillary, forming the lower border of the great ant-orbital foramen, is, in the Malayan race, given off anteriorly to the position of the first molar, while in the Northern race it abuts directly on the first molar. If distinct, it should bear the name SPICIGERA given to it by Buchanan Hamilton, who has excellently figured and prepared a good MS. description of it, founded on a living pair received from Chittagong. "They were brought," he was informed, "from the hills; and, so far as the donor (Mr. Macrae) understands, their habits are pretty much the same as those of the Porcupine of the plains. Both burrow in the earth, live upon roots, and are found either in pairs or families." A specimen brought from Chérra Punji by Mr. Frith corresponds exactly with Buchanan Hamilton's coloured figure.

AVES.

Of birds, the most remarkable are two new species of GARRULAX,—one of SUTHORA,—the SIBIA GRACILIS, (McClelland and Horsfield,) now first verified,—and SPIZIXOS CANIFRONS, nobis, *J. A. S.* XIV, 571. The only specimen we had previously seen of the last named species, although apparently in good order when the description of it

was taken, was soon afterwards completely destroyed by insects, from the skin not having been properly prepared with poison. Mr. Frith has now obtained a fine skin, and also an entire specimen in spirit, this bird proving to be common at Cherra Punji. Length 8 in., by $10\frac{3}{4}$ in. expanse; wing $3\frac{5}{8}$ in.

We have seen a figure of a second and crestless species of this strongly marked genus, from upper Asám.

SIBIA GRACILIS; *Hypsipetes gracilis*, McClelland and Horsfield, *Proc. Zool. Soc.* 1839, p. 159; *J. A. S.* XVI, 449. Resembles S. CAPISTRATA (*Cinclosoma capistratum*, Vigors, v. *S. nigriceps*, Hodgson), except that there is no rufous about it, beyond a faint tinge of this hue on the flanks and lower tail-coverts; the feathers proceeding from the lateral base of the lower mandible, also, are white, though the lores and ear-coverts are uniform black with the crown. General hue of the upper-parts dark ashy (nearly as in S. PICOIDES), paler on the rump and collar; below white, sullied with grey on the sides of the breast and flanks: wings and tail as in S. CAPISTRATA, except that the glossy margins of the secondaries are much darker, and the tertials are dark ashy margined externally with black. Bill black: feet brown, with darker toes.

GARRULAX MERULINUS, nobis, *n. s.* General colour deep olive-brown, the medial portion of the under-parts pale rufescent whitish-brown, and spotted with black on the throat and upper-part of the breast, much as in *Turdus musicus;* a narrow white streak behind the eye. Irides whitish-brown. Bill dusky-plumbeous. Legs brown, with albescent toes. Length $9\frac{1}{2}$ in.; expanse of wings 12 in.; closed wing $3\frac{1}{2}$ in.; tail $3\frac{1}{2}$ in.; bill to gape $1\frac{1}{4}$ in.; tarse $1\frac{5}{8}$ in. Common at Chérra Punji, from whence Mr. Frith has brought several living examples both of this and of the next species.

G. RUFICAPILLUS, nobis, *n. s.* Nearly affined to G. ERYTHROCEPHALUS, (Vigors), from which it is distinguished by having the chin and broad supercilia ash-grey; forehead greyish; throat, front of neck, and breast, rufous, with an admixture of golden-yellow on the last: no black spots on the nape and breast, but darker lunate markings in place of them: rest as in G. ERYTHROCEPHALUS, to which G. CHRYSOPTERUS, (Gould), inhabiting an intermediate range of territory, is also closely affined. Common at Chérra Punji.

SUTHORA POLIOTIS, nobis, *n. s.* Like S. NIPALENSIS (vide *J. A. S.* XII, plate to p. 450), but the lower ear-coverts and sides of the neck are pure ashy, paler on the breast, and passing to white on the abdomen; lores and sides of face, with the plumes growing from the base of the lower mandible, pure white: crown bright fulvous, passing to duller fulvous on the back: wings coloured as in S. NIPALENSIS, but the coverts of the secondaries uniformly fulvous with the back; a fulvous spot behind the eye and below the black supercilium, but no trace of rufous on the cheeks; chin black, with whitish margins, as in S. NIPALENSIS: bill yellowish; and feet pale. Common at Chérra Punji.

There are, accordingly, now three nearly affined races of these curious little birds, besides the larger S. RUFICEPS (*Chleuasicus ruficeps*, nobis, *J. A. S.* XIV, 578), which generically is barely separable.

Of the other birds collected by Mr. Frith at Chérra Punji, the only species we had not previously examined is PTERUTHIUS MELANOTIS, Hodgson, *J. A. S.* XVI, 448. The rest are GECINUS CHLOROPUS, MEGALAIMA VIRENS, HARPACTES ERYTHROCEPHALUS (in spirit), DENDROCITTA SINENSIS, GARRULAX LEUCOLOPHOS, G. ALBOGULARIS, G. SQUAMATUS, G. PHŒNICEUS, ACTINODURA EGERTONII, LEIOTHRIX ARGENTAURIS, L. LUTEUS, L. CYANOUROPTERUS, L. CASTANICEPS, PARUS SPILONOTUS, STACHYRIS NIGRICEPS, ST. CHRYSÆA, POMATORHINUS PHAYREI (with fine coral-orange bill), P. RUFICOLLIS, ÆNICURUS MACULATUS, ABRORNIS SCHISTICEPS, PSARISOMA DALHOUSIÆ, LEUCOCERCA FUSCOVENTRIS, HYPSIPETES MACLELLANDII, HEMIXOS FLAVALA, IOLE VIRESCENS, and ORIOLUS INDICUS. These are mostly species common in the neighbourhood of Darjiling; but POMATORHINUS PHAYREI and IOLE VIRESCENS we had previously only seen from Arakan; and ORIOLUS INDICUS is chiefly an inhabitant of the eastern side of the Bay of Bengal, though, as a rarity, it is now and then met with in Lower Bengal. A large proportion of the above named species are common in Arakan.

[The following descriptions of new species of birds may be here appended.

GARRULAX (?), JERDONI, nobis. Resembles G. (?) CACHINNANS, Jerdon, except that there is no trace of rufous on the cheeks, fore-neck and breast, the black of the chin is also less developed, and the nape is of a dull ashy hue: fore-neck and breast paler ashy, passing to whitish on the ear-coverts. The medial abdominal feathers only are rufous; those of the flanks, back, wings and tail are olive as in G. (?) CACHINNANS, and the head, lores, and supercilia are likewise similar. The

form of the bill and the general characters of these two species, from S. India, indicate that they should form a separate division from GARRULAX proper. G. BELANGERI, Jerdon, of the Nilgiris, and G. CINEREIFRONS, nobis (p. 176, ante), of Ceylon, are typical GARRULACES.

CISTICOLA ERYTHROCEPHALA, Jerdon. General hue rufous or ferruginous, deepest on the crown, darker on the rump, and brightish on all the lower-parts; back olive, with black medial streaks to the feathers; and wings and tail dusky, the former margined with olive-brown, and the latter very slightly tipped or margined round the extremity of the feathers, with pale brown. Legs pale. Wing $1\frac{7}{8}$ in: tail $1\frac{5}{8}$ in. This and the preceding species have just been received from Mr. Jerdon, and are, most probably, from the Nilgiris. Accordingly, three species of CISTICOLA will now have been ascertained from S. India and Ceylon, viz. the common C. CURSITANS, C. OMALURA, nobis (p. 176, ante), from Ceylon, and that here described.

CYORNIS ÆQUALICAUDA, nobis. Female somewhat greyish-brown above, much paler below, whitish towards the vent and on the lower tail-coverts; axillaries also whitish with a faint tinge of fulvous: tail and its upper coverts dull ferruginous, the medial rectrices and exterior webs of the rest sullied with fuscous. Bill dark above, whitish below; feet dark brown. Length about $5\frac{1}{2}$ in., of wing 3 in., and tail $2\frac{1}{4}$ in.: bill to gape $\frac{11}{16}$ in.; and tarse $\frac{5}{8}$ in. A well marked distinct species, procured by Lieut. James, of the 28th B. N. I., in Kunáwar.

SAXICOLA FUSCA, nobis. Evidently a new species of true Wheatear, affined in colouring to S. INFUSCATA, A. Smith; but the general colour deeper, and the head, cheeks, and throat, rufescent: tail also remarkably long, for a species of this genus. We can only describe the fragments of a specimen, viz. the head, wings, tail, and legs. Wing $3\frac{3}{4}$ in.; tail 3 in.: bill to gape $\frac{7}{8}$ in.; From Muttra.]

REPTILIA.

Of this class, Mr. Frith brought five species, as follow:—

1. PLATYDACTYLUS GECKO, (L.), vide *J. A. S.* XVII, 623. Collected at Dacca, the only part of Bengal in which we are aware of its occurrence. This reptile is common in Asám, Sylhet, Arakan, the Tenasserim provinces and Malayan peninsula.

2. CALOTES——? 3. EUPREPIS——? 4. POLYPEDATES——? Apparently three new species, from Chérra Punji; which we defer describing for the present, as we have numerous other new reptiles which it will be more convenient to describe together.

5. TRIGONOCEPHALUS GRAMINEUS, (Shaw). Young, 13 in. long, of the Malayan variety with defined whitish lateral line. From Sylhet. This small individual had bitten a labouring man, but the wound merely caused a painful swelling in the arm, which, however, did not prevent the patient from returning to his work after a few hours; *i. e.* in the afternoon of the day during which he was bitten in the course of the morning. This agrees with the remarks upon the venom of three species of TRIGONOCEPHALUS in *J. A. S.* XVI, 1044 *et seq.**

[We may here describe the following remarkable Bat, purchased with a miscellaneous collection made at Darjiling.

LASIURUS PEARSONII, Horsfield.† Length about 3½ in., of which the tail measures 1¼ in., having its extreme tip exserted. Head ¾ in. Ears (posteriorly) ½ in.; and about 1½ in. from tip to tip. Expanse about 13 in. Fore-arm 1⅞ in.: tarse ¾ in. Head broad and short: the ears broad, subovate, widely separated apart; and the tragus small, narrow and elongated. Teeth very robust; the grinders antero-posteriorly compressed, with the *carnassiez* contiguous to the canine above and below, and the canines less elongated than in the NYCTICEJI: there are four incisors above, of which the outer or lateral are much smaller than the others. Fur soft and extremely dense, of a uniform rufous-brown above and dingy greyish below, with conspicuous hoary tips a little curling, more especially upon the head, shoulders, and breast. The membranes are dusky, and the alar is attached to the base of the outer hind-toe. The lateral membranes near the body, and the whole interfemoral, are somewhat plentifully covered with brownish-rufous fur, more scant on the interfemoral, and very dense at the base of the tail above, being continued throughout its length, and also along the hind-limbs, with the feet and calcanea. Excepting in having two pairs of upper incisors, this species seems to agree generically with the LASIURI, Rafin., of N. America, or VESP. PRUINOSUS and V. RUFUS (v. *noveboracensis)*, auctorum].

* *Notes by Mr. Frith.* "The man was bitten, as above mentioned, at about 10 A. M.; and when I saw him, at about 4 P. M., he was at his work, and the swelling (which had been somewhat considerable) had by that time almost subsided.

"As regards *Talpa leucura* (p. 518), I do not say that it may not inhabit the valleys or lower lands of Chérra, that is to say, at the foot of the hills. The Khásias state that they never met with it there; but some of them at once recognised the animal as being like one found about two or three days' distance in the interior, but which they stated to be of a white colour."

We should here add that Mr. Frith has favoured the Society with a free selection from the above interesting collection.

† Since the above description had gone to press, we have received Dr. Horsfield's Catalogue of the Mammalia in the Hon. Company's museum, in which we find ourselves forestalled as regards the specific name.

A letter from EDWARD THOMAS, *Esq. C. S. On Sassanian Coins.*

MY DEAR DR. SPRENGER.—I send you herewith a wood-cut of a Coin I wish you to insert in the next number of the Journal of the Asiatic Society, with a view to soliciting the aid of your numismatic supporters in contributing impressions of any similar specimens to be found in their cabinets.

The subject of Sassanian influence in India, its epoch, and the boundaries over which Zoroastrian belief extended, is fraught with high interest in itself, but it possesses an enhanced claim upon our attention in the light it promises to throw upon the anterior, or Scythic, period of Indian history.

Up to this time, we have but scant materials, either legendary or monumental, whereby to illustrate the first named question, and we dare scarcely hope that Numismatic Science can do much to *help* our cause, as the number and variety of Indo-Sassanian Coins is clearly limited. The piece about to be described, however, places us a material step in advance, and Indian Annals have already received such great and un-hoped for elucidation from this section of Antiquarian research, that we have a right even here to augur well for our future.

The Coin of which the accompanying engraving is a facsimile, presents us with a strictly Rajpút name impressed upon the surface of a piece of money of a purely Sassanian type. I will not at present venture into the ample field of speculation this association opens out, but content myself with noticing the bare fact, trusting that your call for new specimens, may succeed in drawing forth from dark-corners, other coins of this class, thus securing an extended circle of medallic data, from which to deduce more comprehensive and legitimate inferences than the evidence of a single piece admits of.



The coin under review was obtained by Major Nuthall of the Commissariat Department during a late march to Peshâwur. It is of silver, and weighs 52 grains. The *Obverse*, here represented,* bears the name of

* The original is in imperfect preservation, especially as regards the neck of the figure—I have left the letters composing the legend unshaded, in order to render more exactly their true form.

राजा पम—उदयादित्य
Rájá Pam? Udayáditya.

The *Reverse* surface presents a mere blank, retaining *only* slight traces of ever having received an impression.

As connected with the general subject of Indo-Sassanian Numismatics, your readers may not be uninterested to learn the progress made of late years in Europe in the decipherment of Pehlvi Legends, in so far as concerns the interpretation of the writings on the Sassanian Coins exhumed from the Topes of the Punjáb and Afghánistán, which are moreover so closely identified with the progress of our Journal, whose pages contain the earliest notice of these Antiquities, and whose plates display a still unrivalled series of delineations of the various relics disinterred by Messrs. Ventura and Court.

Pl. XXI. Vol. III. Fig. 8. *Journ. Asiat. Soc. Beng.*

OBVERSE in Pehlvi Characters—

behind the head, افزوت Increase

in front of the face, افدولا
literally, ... هزمان } for

عبد الله حازمان Abdullah-i-Házimán, or Abdullah the son of Házim.

MARGIN. بسم الله in Kufic letters.

REVERSE. *On the left,* شش شست (A. H.) 64.

on the right, مرو Merv.

Pl. XXI. Fig. 10. OBV. *in front of the face,* a Scythic? legend.

MARGIN. श्रोद्दितिविर ऐरलाव परमेश्वर

possible variants च ख च

(continued) श्रोपद्दितिष तदेव नारित

variants च च क

REVERSE. *Left* صف تنسف تيف

Right تكهون خراسان صلكا

The Coin engraved as No. 6, Pl. XXV. Vol. III. J. A. S. B. is so closely identified with the *Tope* Indo-Sassanian specimens, that it may be as well to complete this portion of the subject, by giving the latest reading of its Pehlvi legends.

OBVERSE. *Left* श्रीवासुदेवः
Right (literal transcript,) پنچاي ذاولستان
MARGIN. سپر نرمانشان or صفر
REVERSE. *Right* صف ورسوتيف
MARGIN. *پون شمي دات صف ورساوتيف وهمان از ملتان ملكا

It is necessary to add, that the above are mere tentative readings, the decipherment of the Coin of Abdullah Hájim, which is beyond dispute, being the single exception.

With an Alphabet so imperfect as the Ancient Persian—Sassanian Pehlvi—consisting of 17 literal signs only, convertible largely among themselves, and subjected to considerable variation in provincial value, expressing too a language, the very rudiments of which are but partially known to us, no interpretation however well wrought out *per se*, can be said to stand good until affirmed by some valid extraneous evidence.

My object indeed in publishing such crude readings is to court criticism, with a sincere view to just correction, but further to give your readers an idea of what the Pehlvi Alphabet is reproachable with, apart from the difficulty of the language it conveys or the imperfection of the expression of its Letters. I may mention that the sign ے stands avowedly for ا, ه, ح, خ, and ع, and is at times undistinguishable from the nearly similarly outlined form of the same Alphabet which corresponds with the modern ر and ل س have usually one sign in common as also have the still more puzzling pair و and ی their ancient representative also serving to express the silent final.

And, as a pertinent instance of provincial irregularities, I would cite, the entire disuse of the character ب=ل in all Indo-Sassanian coin-legends, that letter being replaced by the و answering to the Sanscrit व, V.

But I must not say too much of the obstacles to be encountered in the study of Ancient Persian, or I may chance to deter many otherwise willing scholars from attempting the pursuit of this important branch of Archæological research.

Yours, &c.

Simlah, October 17, 1851. EDWARD THOMAS.

* In nomine justi judicis. "Anquetil."

Monthly Means of Maximum and Minimum Pressures, for Ten Years, 1840 *to* 1849, *taken from the Meteorological Register kept at the Surveyor General's Office Calcutta.*

Lat. 22° 33′ 28″. 33 N. Long. 88° 23′ 42″. 84 E.

Months.	1840.								1841.							
	Maximum Pressure observed at 9. 50. A. M.				Minimum Pressure observed at 4 P. M.				Maximum Pressure observed at 9. 50. A.M.				Minimum Pressure observed at 4 P. M.			
	Barometer.	Of the Mercury.	Of the Air.	Of an Evaporating surface.	Barometer.	Of the Mercury.	Of the Air.	Of an Evaporating surface.	Barometer.	Of the Mercury.	Of the Air.	Of an Evaporating surface.	Barometer.	Of the Mercury.	Of the Air.	Of an Evaporating surface.
	Inches.	o	o	o	Inches.	o	o	o	Inches.	o	o	o	Inches.	o	o	o
January, ...	30.090	68.3	73.6	67.7	29.999	72.4	79.6	70.4	29.985	70-2	74.2	66.1	29.913	73.2	79.5	71.6
February,.....	.020	74.5	78.8	72.9	.915	77.5	85.4	75.4	.996	73.5	80.2	71.7	.918	77.4	85.3	75.1
March,.....	29.944	82.2	86.2	79.5	.852	86.2	94.3	82.6	.855	79.3	83.8	76.2	.776	83.5	88.9	75.5
April, ...	.816	85.4	90.1	82.5	.721	88.4	94.8	83.5	.799	84.7	89.2	82.2	.710	88.4	95.3	82.7
May, ...	.768	85-4	88.7	83.6	.693	87.8	91.2	84.4	.711	85.5	89.9	83.6	.652	88.0	92.2	83.5
June, ...	.652	84.0	86.2	82.8	.581	85.0	87.4	83.2	.540	86.4	89.6	84.8	.463	87.4	89.3	84.6
July, ...	.650	84.6	87.2	83.5	.581	85.2	86.6	83.1	.467	83.8	86.2	83.0	.399	85.1	87.3	83.3
August, ...	.663	83.1	84.7	82.3	.594	83.7	84.1	81.8	.617	83.9	86.3	82.8	.549	84.6	86.6	83.2
September, ...	.763	83.6	86.3	82.6	.687	84.7	86.6	82.5	.680	84.5	87.9	83.3	.600	85.7	87.9	83.4
October, ...	.927	82.8	87.7	80.5	.851	85.2	89.4	80.7	.882	83.6	88.2	81.3	.814	84.5	89.0	81.5
November, ...	30.008	75.5	80.7	72.9	.915	78.1	83.9	75.1	.895	77.4	81.6	75.2	.821	79.9	85.4	77.8
December, ...	.998	69.0	74.0	66.9	.930	72.1	79.0	79.5	.921	68.9	73.9	67.4	.852	72.9	79.2	72.0

Monthly Means of Maximum and Minimum Pressures, for 1842 *and* 1843, *taken from the Meteorological Register kept at the Surveyor General's Office, Calcutta.*

Lat. 22° 33′ 28″. 33 N. Long. 88° 23′ 42″. 84 E.

Months.	1842.								1843.							
	Maximum Pressure observed at 9. 50. A. M.				Minimum Pressure observed at 4 P. M.				Maximum Pressure observed at 9. 50. A. M.				Minimum Pressure observed at 4 P. M.			
	Barometer.	Of the Mercury.	Of the Air.	Of an Evaporating surface.	Barometer.	Of the Mercury.	Of the Air.	Of an Evaporating surface.	Barometer.	Of the Mercury.	Of the Air.	Of an Evaporating surface.	Barometer.	Of the Mercury.	Of the Air.	Of an Evaporating surface.
	Inches.	°	°	°	Inches.	°	°	°	Inches.	°	°	°	Inches.	°	°	°
January,	29.976	70.6	75.3	68.4	29.902	75.2	83.1	73.7	29.987	68.9	72.1	66.9	29.892	71.8	77.8	71.0
February,	.940	74.9	80.0	72.0	.848	80.7	89.3	76 8	.885	74.4	77.7	72.7	.795	77.3	85.1	70.9
March,	.825	79.7	82.7	78.1	.742	84 1	90.2	82.1	.829	79.5	83.4	76.6	.750	83.0	90.3	83.2
April,	.743	85.7	89.5	84.0	.655	90 2	95.4	86.1	.811	83.3	88.0	81.9	.711	87.5	94.6	84.6
May,	.665	87.3	91.8	86.2	.586	90.2	94.0	87.0	.686	85.4	89.4	83.7	.610	87.8	93.1	84.8
June,	.489	82.9	83.3	80.8	.418	84.3	84.4	81.9	.554	85.1	88.3	83.4	.492	87.8	91.5	85.2
July,	.485	84.6	86.5	83.5	.421	85.8	87.0	83.9	.554	83.6	87.5	83.3	.495	84.0	86.5	82.6
August,	.597	83.3	84.9	82.7	.535	84.4	85.1	83.0	.606	82.9	86.1	82.4	.541	84.2	86.9	82.8
September,	.685	84.1	85.6	83.1	.608	85.8	86.3	84.2	.698	83.3	87.0	82.9	.625	84.2	86 4	82.6
October,	.821	82.1	84.1	79.1	.750	83 9	86.4	80.2	.915	80.9	85.6	80.0	.839	83.2	86.1	80.6
November,	.915	76.1	79.2	72.1	.841	78.4	82.5	73.7	.944	75.5	78.5	73.3	.861	78.9	82.1	75.6
December,	.979	71.1	74.3	68.9	.889	74.0	78.2	71.8	30.011	68.8	71.2	67.2	.923	72.3	75.5	71.0

Monthly Means of Maximum and Minimum Pressures, for 1844 *and* 1845, *taken from the Meteorological Register kept at the Surveyor General's Office, Calcutta.*

Lat. 22° 33′ 28″. 33 N. Long. 88° 23′ 42″. 84 E.

Months.	1844.								1845.							
	Maximum Pressure observed at 9. 50. A. M.				Minimum Pressure observed at 4 P. M.				Maximum Pressure observed at 9. 50. A. M.				Minimum Pressure observed at 4 P. M.			
	Barometer.	Of the Mercury.	Of the Air.	Of an Evaporating surface.	Barometer.	Of the Mercury.	Of the Air.	Of an Evaporating surface.	Barometer.	Of the Mercury.	Of the Air.	Of an Evaporating surface.	Barometer.	Of the Mercury.	Of the Air.	Of an Evaporating surface.
	Inches.	°	°	°	Inches.	°	°	°	Inches.	°	°	°	Inches	°	°	°
January, ...	29.996	68.1	70 3	66.4	29.907	72.2	77.9	71.1	30.206	70.1	70.9	68.2	30.102	77.6	81.6	72.6
February, ...	.973	72.4	74.1	70.3	.879	78.7	84 6	75.4	.066	73.3	74.6	65.6	29.936	83.4	82.2	67.3
March, ...	.849	81.4	84 3	79.3	.762	87.1	92.6	83.3	29.962	83.0	85 0	72.4	.829	93.6	93.0	71.3
April, ...	.713	86.1	89.2	83.8	.616	90.1	93.8	86 0	.816	85.7	87 1	78.9	.690	89.7	89.0	79.1
May, ...	.610	85.8	88.0	85.1	.524	89.0	90.1	86.4	.697	90.5	90.6	81.3	.581	93.0	92.4	80.3
June, ...	.681	86.4	87.0	84.5	.589	88.8	88.9	85.7	.588	87.5	88.0	81.5	.483	89.6	89.2	81.6
July, ...	.712	84.6	84.8	83.5	.625	85.8	85.4	83.9	.563	86.0	86.1	80.9	.482	88.4	87.3	81.2
August, ...	.715	84.0	84.6	83 3	.622	84.8	84.7	83.4	.562	85.1	85.5	80.6	.472	86.2	85.8	80.4
September, ...	.891	84.3	86.4	84.3	.789	86.3	86.4	84.3	.781	87.1	87.8	80.6	.671	88 6	88.4	79.1
October, ...	30.025	82.1	83.9	82.2	.924	84.8	85.5	83.5	.865	84.3	84.8	77.0	.751	86.0	86.4	75.6
November, ...	.152	77.0	80.4	77.2	30.046	80.9	83.8	80.6	30.071	78.5	79.1	69.5	.959	83.5	81.9	68.1
December, ...	.173	70.2	72.9	69.1	.063	75.4	79.0	74.6	.076	71.0	71.8	63.9	.959	79.6	75.5	64.5

Monthly Means of Maximum and Minimum Pressures, for 1846 *and* 1847, *taken from the Meteorological Register kept at the Surveyor General's Office, Calcutta.*

Lat. 22° 33′ 28″. 33 N. Long. 88° 23′ 42″. 84 E.

Months.	1846.								1847.							
	Minimum Pressure observed at 9. 50. A. M.				Maximum Pressure observed at 4 P. M.				Maximum Pressure observed at 9. 50. A. M.				Minimum Pressure observed at 4 P. M.			
	Barometer reduced to 32° Fahrenheit.	Of the Mercury.	Of the Air.	Of Wet Bulb.	Barometer reduced to 32° Fahrenheit.	Of the Mercury.	Of the Air.	Of Wet Bulb.	Barometer reduced to 32° Fahrenheit.	Of the Mercury.	Of the Air.	Of Wet Bulb.	Barometer reduced to 32° Fahrenheit.	Of the Mercury.	Of the Air.	Of Wet Bulb.
	Inches	°	°	°	Inches	°	°	°	Inches.	°	°	°	Inches.	°	°	°
January, ...	30.139	71.9	72.8	65.7	30.016	79.8	78.5	66.2	30.026	70.5	71.2	62.8	29.907	78.5	77.2	65.3
February, ...	.078	73.9	74.7	67.6	29.955	80.4	79.1	68.6	.038	72.1	73.0	65.1	.916	80.6	80.0	65.6
March, ...	29.922	83.9	84.6	75.6	.794	91.8	91.6	75.2	29.942	83.6	84.6	73.4	.806	92.7	91.8	71.8
April, ...	.827	89.4	90.1	79.0	.695	95.0	94.6	79.0	.811	88.2	87.6	80.1	.682	92.3	90.1	79.7
May, ...	.726	89.7	89.9	81.0	.606	93.9	93.6	81.6	.703	70.5	89.5	81.8	.587	93.2	91.4	80.8
June, ...	.626	87.6	86.2	81.6	.529	88.1	88.1	81.1	.585	89.1	87.5	81.8	.494	90.1	88.5	81.7
July, ...	.607	85.9	86.2	81.2	.522	86.7	88.6	81.0	.591	86.8	85.8	81.9	.500	88.3	86.9	80.8
August, ...	.603	86.2	86.0	81.4	.512	86.9	86.8	81.3	.630	86.6	86.3	81.5	.533	87.0	85.4	80.8
September, ...	.676	85.1	85.6	80.7	.570	85.9	85.7	80.7	.704	87 5	86.3	81.1	.598	86.8	85.7	80.0
October, ...	.849	83.0	83.4	78.7	.737	84.0	84.1	78.7	.920	84.3	83.9	78.6	.809	86.7	85.4	76.6
November, ...	30.011	79.3	80.0	72.2	.902	82.9	81.7	71.3	30.008	77.6	77.5	70.5	.892	81.5	80.1	69.2
December, ...	.082	70.4	70.8	65.7	.968	76.3	74.9	64.1	.047	69.6	70.2	63.0	.931	76.7	75.2	63.9

Monthly Means of Maximum and Minimum Pressures, for 1848 *and* 1849, *taken from the Meteorological Register kept at the Surveyor General's Office, Calcutta.*

Lat. 22° 33′ 28″. 33 N. Long. 88° 23′ 42″. 84 E.

Months.	1848.								1849.							
	Maximum Pressure observed at 9. 50. A. M.				Minimum Pressure observed at 4 P. M.				Maximum Pressure observed at 9. 50. A M.				Minimum Pressure observed at 4 P. M.			
	Barometer reduced to 32° Fahrenheit.	Of the Mercury.	Of the Air.	Of Wet Bulb.	Barometer reduced to 32° Fahrenheit.	Of the Mercury.	Of the Air.	Of Wet Bulb.	Barometer reduced to 32° Fahrenheit.	Of the Mercury.	Of the Air.	Of Wet Bulb.	Barometer reduced to 32° Fahrenheit.	Of the Mercury.	Of the Air.	Of Wet Bulb.
	Inches.	o	o	o	Inches.	o	o	o	Inches.	o	o	o	Inches.	o	o	o
January,	30.071	68.0	69.3	60.4	29.929	78.7	77.3	60.8	30.114	67.7	68.4	61.1	29.989	77.0	75.3	62.9
February,	.054	74.7	75.2	66.5	.907	85.8	84.6	67.8	.027	73.7	74.0	67.2	.880	82.6	81.2	67.7
March,	29.899	83.8	83.7	75.1	.758	94.0	92.6	75.1	29.924	83.0	83.0	73.8	.794	91.5	90.0	71.9
April,	.782	89.5	89.1	80.0	.651	94.1	92.7	80.5	.779	90.0	89.4	79.5	.634	97.0	95.2	78.9
May,	.702	91.4	90.6	81.5	.571	95.6	93.9	81.4	.691	90.6	90.0	81.6	.564	95.2	93.0	80.7
June,	.563	88.6	87.4	81.7	.469	88.7	87.3	81.4	.603	88.3	87.2	81.2	.501	90.2	88.9	81.5
July,	.575	88.0	86.9	81.8	.481	88.2	87.1	81.4	.624	87.9	86.6	81.1	.531	89.2	88.0	81.6
August,	.623	86.3	85.5	80.9	.520	87.5	86.6	81.0	.639	86.8	85.8	81.1	.533	87.1	85.9	81.2
September,	.766	88.2	87.0	80.7	.661	88.7	87.2	79.8	.704	89.0	87.3	81.3	.590	87.6	86.1	80.8
October,	.938	84.3	83.6	76.8	.825	87.6	85.9	75.5	.906	85.5	85.1	78.1	.789	86.9	85.5	77.1
November,	30.068	78.0	77.9	69.9	.948	83.1	81.4	69.3	30.028	79.8	80.0	71.7	.903	85.7	84.1	71.1
December,	.086	73.6	74.1	67.5	.957	80.8	79.0	67.2	.088	68.1	68.7	62.0	.967	75.3	73.9	63.0

Abstract of Meteorological Mean Monthly *Summaries for ten years*, 1841 *to* 1850.

Months.	Monthly Mean Temperature Fahrenheit.			Atmospheric Variation.		Rain Gauge.	Remarks.
	Minimum at Sunrise.	Maximum at 2. 40. P. M.	At Sunset.	Maximum Pressure in Inches reduced to 32°.	Minimum Pressure in Inches reduced to 32°.	Rain in Inches.	
	o	o	o	o	o	o	
January, ...	59.6	79-2	74.0	30.055	29.947	0.71	
February,....	64.2	84.2	78.1	.015	.899	0 71	
March,.....	72.3	92.3	85.1	29.896	.783	0.13	
April, ...	78 3	96.0	87.6	.794	.677	2.57	
May, ...	80.3	94.1	87.6	.694	.592	4.56	
June, ...	80.9	89.3	85.1	.577	.489	12.88	
July, ...	80.6	87.8	84.1	.576	.497	14 12	
August, ...	80.3	86.9	83.5	.629	.541	16.08	
September, ..	80.3	87.7	84.1	.733	.635	9.76	
October, ...	76.7	87.2	83.0	.908	.805	4.98	
November, ..	67.5	83.9	78.9	30.010	.909	0.85	
December, ..	60.0	78.5	73.5	.059	.951	0.52	
Mean, ...	73.4	87.3	82.1	29.829	29.727	5.66	

Abstract of Meteorological Mean Annual *Summaries for ten years,* 1841 *to* 1850.

Years.	Annual Mean Temperature Fahrenheit.			Atmospheric Variations.		Rain Gauge.	Remarks.
	At Sunrise.	At 2. 40. P. M.	At Sunset.	Maximum Pressure in Inches reduced to 32°	Minimum Pressure in Inches reduced to 32°	Rain in Inches.	
	°	°	°	°	°	°	
1841, ...	72.7	89.0	82.4	29.779	29.707	60.24	
42, ...	73.3	88.0	82.1	.760	.683	76.08	
43, ...	73.3	87.6	82.5	.790	.711	64.32	
44, ...	72.7	87.6	82.3	.874	.779	73.92	
45, ...	73.7	86.9	82.3	.854	.743	60.96	
46, ...	74.3	86.3	81.9	.845	.734	76.44	
47, ...	73.2	86.1	81.1	.833	.638	72.36	
48, ...	74.1	87.4	82.5	.844	.723	58.68	
49, ...	73.6	86.7	81.8	.844	.723	70.56	
50, ...	73.1	86.1	81.4	.864	.745	56.28	
Mean, ...	73.4	87.2	82.0	29.829	29.719	66.97	

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of August, 1851.

Date.	Observations made at Sun-rise.						Maximum Pressure observed at 9h. 50m.						Observations made at Apparent Noon.					
	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind. Direction at Sun-rise.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind. Direction at 9h 50m.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind. Direction at Noon.	Aspect of Sky.
	Inches	°	°	°			Inches	°	°	°			Inches	°	°	°		
1	29.492	80.7	80.9	79.8	S.	Cirro-strati	29.530	86.2	87.0	81.4	S. E.	Cumulo-strati	29.496	89.0	89.8	81.3	E. N. E.	Cumulo-strati
2	.497	82.0	82.3	80.4	N. E.	Scattered-clouds	.529	87.2	87.8	82.2	N. E.	Ditto	.521	88.2	87.6	83.4	N. N. E.	Cloudy
3S.	.493	82.0	82.2	80.8	N. E.	Ditto	.523	84.2	86.0	82.8	N. E.	Ditto	.483	88.2	88.6	82.7	N.	Ditto
4	.418	81.6	82.0	81.0	E.	Cloudy	.462	84.2	84.0	82.3	E. S. E.	Nimbi	.465	87.4	88.4	81.8	E. S. E.	Cumulo-strati
5	.531	80.4	80.6	79.2	S. E.	Cirro-strati	.582	84.6	86.2	82.1	S. S. E.	Cumulo-strati	.559	87.2	87.2	80.8	S.	Cloudy
6	.543	81.8	81.8	80.2	S.	Scattered-clouds	.592	82.5	83.2	81.3	S. S. E.	Nimbi	.556	82.8	82.5	80.6	S. E.	Ditto
7	.573	81.0	80.5	79.8	S.	Raining	.605	82.2	83.7	82.4	S.	Cloudy	.588	86.0	86.7	83.0	S.	Ditto
8	.601	80.3	81.0	80.2	S. S. W.	Cloudy	.646	84.9	86.3	83.3	S.	Ditto	.624	86.3	86.9	82.6	S.	Ditto
9	.589	82.0	82.2	80.4	S. S. W.	Cirro-cumuli	.645	85.8	87.0	81.2	S. S. W.	Cirro-cumuli	.622	88.0	88.5	80.3	S. W.	Cirro-cumuli
10S.	.601	81.0	81.3	79.7	S. W.	Cloudy	.667	85.3	86.0	81.6	S. W.	Cloudy	.648	86.5	87.4	81.5	W.	Cloudy
11	.621	81.7	82.3	81.4	E.	Cirro-cumuli	.683	86.7	87.6	82.2	W.	Cirro-cumuli	.647	88.6	90.0	84.0	S. S. W.	Cumulo-strati
12	.605	82.0	82.3	81.0	S.	Cirro-strati	.633	87.0	88.0	83.0	S. S. W.	Cumulo-strati	.604	89.2	89.6	83.4	W. N. W.	Ditto
13	.564	82.4	82.5	81.0	S.	Scattered-clouds	.568	85.8	86.4	82.4	S. W.	Ditto	.548	88.8	89.5	83.2	W. N. W.	Cumuli
14	.536	82.8	83.0	81.2	W. N. W.	Ditto	.578	86.6	88.2	82.4	N. W.	Cirro-strati	.565	90.2	91.7	84.0	N. W.	Cirro-strati
15	.638	81.3	80.5	78.7	N.	Raining	.671	83.3	84.5	81.3	N.	Cloudy	.643	86.2	86.5	82.0	N. E.	Cloudy
16	.669	80.2	80.2	78.9	N.	Cloudy	.719	83.9	85.3	82.2	N. E.	Cumulo-strati	.682	87.3	88.0	82.6	N. E.	Cumulo-strati
17S.	.702	80.4	80.9	80.0	S. E.	Overcast	.749	83.6	84.3	81.0	S. E.	Cloudy	.739	86.0	86.7	82.0	S. E.	Ditto
18	.722	81.9	81.2	80.8	*S.	Cloudy	.738	86.4	87.4	82.0	S.	Cirro-strati	.704	88.7	89.6	83.0	S. S. W.	Ditto
19	.692	81.3	81.7	80.4	S. S. W.	Ditto	.722	83.8	85.0	82.2	S. W.	Cloudy	.687	86.3	86.8	82.2	S. W.	Cloudy
20	.672	80.4	81.0	79.8	S. E	Ditto	.717	83.6	84.4	81.4	S.	Cumulo-strati	.693	86.0	86.4	82.4	S.	Cumulo-strati
21	.706	78.8	79.0	78.3	S. S. E.	Raining	.753	83.7	85.0	81.0	S. S. E.	Ditto	.724	86.8	87.0	81.6	S.	Ditto
22	.696	80.4	80.6	79.7	S. E.	Cirro-strati	.755	86.6	87.3	81.9	E.	Ditto	.716	88.2	89.3	81.2	E. N. E.	Ditto
23	.689	81.0	81.3	81.0	S. E.	Ditto	.732	85.6	87.0	81.8	S. E.	Ditto	.694	87.4	87.6	81.7	S. E.	Ditto
24S.	.660	80.4	80.6	80.0	E.	Scattered-clouds	.724	84.2	86.0	81.6	S.	Ditto	.689	87.0	89.7	81.5	S.	Cloudy
25	.707	80.7	81.0	80.0	E.	Cirro-cumuli	.756	84.2	86.0	82.2	E.	Ditto	.731	86.0	86.8	82.5	S. E.	Cumulo-strati
26	.699	80.2	80.6	79.7	E.	Cirro-strati	.703	85.8	87.0	80.8	E.	Ditto	.663	87.0	84.8	81.8	S. S. W.	Nimbi
27	.601	81.3	81.4	80.5	S. E.	Ditto	.649	85.5	87.4	81.7	E.	Ditto	.615	88.5	89.3	82.0	S. E.	Cumulo-strati
28	.598	82.3	82.4	80.7	S. E.	Cirro-cumuli	.647	86.9	87.6	81.0	S. E.	Cumuli	.613	90.0	91.0	82.7	E.	Ditto
29	.651	83.0	83.4	82.0	S E.	Cirro-strati	.671	88.6	89.8	83.7	N. E.	Cumulo-strati	.639	91.4	92.6	83.4	E. N. E.	Ditto
30	.612	84.4	84.4	82.7	S.	Cloudy	.628	86.6	87.3	82.4	E.	Cloudy	.595	90.2	91.2	82.9	E.	Cirro-strati
31S.	.548	81.4	81.7	80.4	E. N. E	Ditto	.580	86.0	86.8	82.0	E. S. E.	Cumulo-strati	.550	88.5	89.0	82.8	E.	Nimbi
Mean	29.610	81.3	81.5	80.3	....	.....	29.650	85.2	86.3	82.0	....	.....	29.623	87.7	88.3	82.3	....	.....

[*Meteorological Register, continued.*]

Observations made at 2hs. 40m.						Minimum Pressure observed at 4 p. m.						Observations made at sun-set.						Maximum and Minimum Thermometer.				Rain Gauges. Elevations.		Moon's Phases.	Date.
Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind. Direction at 2h 40m p. m.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind. Direction at 4 p. m.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind. Direction at Sunset.	Aspect of Sky.	Max.	Mean.	Min.	Max. Therm. in Sun's rays.	Feet. 60. Upper	Feet. 5. Lower		
Inches	°	°	°			Inches	°	°	°			Inches	°	°	°			°	°	°	°	Inch.	Inch.		
29.453	91.0	91.3	82.2	N. E.	Cumulo-strati	29.420	91.6	91.4	81.6	ENE.	Cumulo-strati	29.435	88.8	87.0	81.7	S. E.	Cloudy	92.3	86.4	80.4	109.6	0 06	0 08		1
.454	90.0	88.8	82.2	S. E.	Nimbi	.428	90 0	90.5	82 4	N. E	Ditto	.461	88 8	88.5	82.2	N. E.	Cumulo-strati	91.2	86.6	81.9	101.8	0.34	0.38		2
.412	84.6	85.2	82.4	E.	Ditto	.379	83.5	82.3	80.4	E.	Nimbi	.414	83 3	82.0	81.5	N. E	Cloudy	89.3	84.3	79.2	102.8	0 42	0 46		3
.429	89.0	89.0	82.3	ESE.sp.	Cumulo-strati	.423	87.4	85.0	82.2	SE.-p.	Cumulo-strati	.468	84.0	84.0	80 5	S.	Ditto	89.6	85.2	80.8	100.6	0.12	0 16	D	4
.519	87.0	86.8	80.6	S.	Cloudy	.506	87.6	87.8	80.6	S.	Cirro-strati	.514	84 4	84.4	80.0	S.	Cirro-strati	88.2	84 0	79.7	99.8	0 29	0 33		5
.511	86.8	87.2	82.8	S.	Nimbi	.483	86.6	86 2	81.6	S.	Cloudy	.501	85.2	84.5	81.9	S.	Ditto	87.6	84 2	80.7	98.3	0.23	0 32		6
.521	84 0	81 4	79.2	SS. W	Raining	.522	82.4	82.6	81 3	S	Raining	.560	81 5	82 3	78.2	S. W.	Raining	87.2	83.5	79 8	93.4	0.52	0.58		7
.532	86.6	86 7	82.8	SS. W.	Cloudy	.527	86.4	86.4	82,2	SSW.	Cloudy	.567	85.2	85.5	82,2	S.	Cirro-cumuli	87.7	83 0	78.2	95.8	..	..		8
.558	89.0	88 0	81.7	W.	Cumulo-strati	.544	89,0	89,2	81.9	S. W.	Cumulo-strati	.585	85.6	81 3	79,0	S.	Raining	90.2	85.9	81.6	100 8	0 99	1.06		9
.581	86 8	86 9	81 3	W.N.W.	Cloudy	.560	87.4	87.6	81.2	w.s.w	Cloudy	.587	86,4	86.2	82,3	S.	Cirro-cumuli	88.0	84.1	80.2	95.2	..	..		10
.573	90 2	90.7	83 5	S. W.	Cirro-strati	.563	90.6	90,3	82.6	S.	Cirro-cumuli	.580	88 8	87.8	82,3	SSW.	Cirro-strati	91.4	86.3	81.2	108.5	..	..		11
.547	90.0	91.4	84 5	S. W	Cumulo-strati	.526	90.6	90,6	83.6	S.	Cumulo-strati	.533	88.0	87.3	83.5	S.	Scattered-clds.	91.4	86.5	81 5	100 6	..	..		12
.486	90.6	90.7	83.5	W.	Cloudy	.463	89.7	89.4	83.8	S.	Cloudy	.498	86.8	86.2	82,3	S. W.	Cloudy	91.6	86.8	81.9	101.2	..	..		13
.527	89.3	88.8	82.4	N. E.	Ditto	.547	88,0	88.0	83.0	ENE.	Ditto	.544	86,0	85.5	82,0	N. W.	Raining	91.6	87.2	82.8	100.8	1.51	1 58		14
.612	85.7	85.4	82,0	N. E.	Ditto	.610	85 0	85.0	82 5	N. E.	Raining	.635	81.0	81.2	79,3	E.S.E	Ditto	87.0	83.1	79.2	97 3	0,22	0 26		15
.628	87.8	89.4	84,9	NNW.	Nimbi	.614	85,4	84.6	81,0	N. W.	Nimbi	.646	82,2	81.6	79 8	S.	Nimbi	90.2	85.0	79.7	103.2	0.70	0 74		16
.658	88,3	86.2	81,3	S. E.	Cirro-strati	.636	87,8	87.4	81.8	S. E.	Cirro-strati	.659	84.0	83.4	81.7	S.	Raining	90.8	85.3	79.8	109.6	0.24	0 28		17
.630	88.0	87.8	83.2	S.	Cloudy	.619	87.0	86.4	82.2	S.	Cloudy	.644	85,2	85.0	81.5	S. W.	Cloudy	90.4	85 9	81.4	101 8	1.24	1.34		18
.626	87.3	87.4	83,0	S.	Cirro-strati	.587	86,4	85.8	82.0	S.	Ditto	.620	85.0	84.9	81.0	S.	Ditto	88.0	82.5	77.0	97.0	1.72	1.84		19
.637	86 2	86 5	81,0	S.	Cumulo-strati	.590	85,8	85,2	81.3	S.	Ditto	.626	83.5	83.2	80.6	S.	Scattered-clds.	87.0	83.6	80.1	98.7	0.12	0.14	☾	20
.658	88.3	88.5	81,8	S. E.	Nimbi	.631	87,2	87.8	82.2	S.	Cumulo-strati	.649	85.4	85.4	80.8	S. E.	Cloudy	89.0	83.3	77.6	102.4	..	..		21
.638	89.6	88.2	82,4	S.S.E	Cumulo-strati	.612	88,0	88.2	82.0	S. E.	Ditto	.637	87.0	86.6	81,5	S.	Cumulo-strati	91.6	85.8	79.9	110.2	..	..		22
.637	87.2	87.0	81,5	S. E.	Ditto	.610	85.0	84.3	80.7	S. E.	Cloudy	.649	84.2	84.2	80.6	S. E.	Cloudy	88.8	84.7	80.5	97.8	..	..		23
.627	86.0	85.3	81,8	S.	Cloudy	.610	85.0	84.0	80.3	S. E	Cumulo-strati	.646	85.2	84.2	80,2	E.	Ditto	89.4	85.4	79.6	98.8	0.30	0 36		24
.667	85.9	85.7	81.8	S. E.	Ditto	.635	86.6	87.2	82.0	S.	Ditto	.663	84.0	84.2	81 4	S.	Cirro-strati	87.8	84 0	80.2	104.0	0.14	0.17		25
.605	89.4	90.1	83,2	S.	Cumulo-strati	.566	89.0	88.0	82,5	S.	Ditto	.575	88,2	86.7	81.5	S.	Cumulo-strati	90 4	85 0	79.5	105.6	0.05	0,06		26
.549	90.2	90 3	82.5	S.	Ditto	.516	90.3	89 5	81.6	E.S.E.	Ditto	.538	87.6	87.4	82 3	E.S.E.	Scattered-clds.	91,0	85.8	80.6	108.2	..	..		27
.562	92,0	92.2	82.3	N. E.	Ditto	.535	91.6	92.0	82,5	E.NE	Ditto	.543	87.7	87.1	80.5	S.	Cumulo-strati	93.0	87.4	81.8	111 3	..	..	●	28
.559	93.8	94.4	84 3	E.NE	Ditto	.537	94.0	94.6	84,7	N. E.	Ditto	.529	91.0	89.2	80 3	S. E.	Ditto	94.8	89.0	83,1	113.3	..	..		29
.561	86.9	86 6	82.9	E.NE	Cloudy	.531	88.0	88.2	83.2	E.	Ditto	.551	85.0	84.7	81.2	S. E.	Cloudy	91.8	88 0	84.2	104.9	0.28	0 32		30
.500	87.6	88.0	81.6	S. E.	Nimbi	.481	88,0	86.4	82,2	S.	Cirro-strati	.503	86,1	84.9	81.0	S.	Ditto	89.8	85.4	80.9	103.4	0.26	0.32		31
29.564	88.2	88.2	82.4	....	.....	29,542	87.8	87.5	82 0	....	.....	29.567	85.7	85 0	81.1	....	.....	89.9	85 3	80.5	102 5	9.80	10.78		

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Fig. 1.



Fig. 2.



Fig. 3.

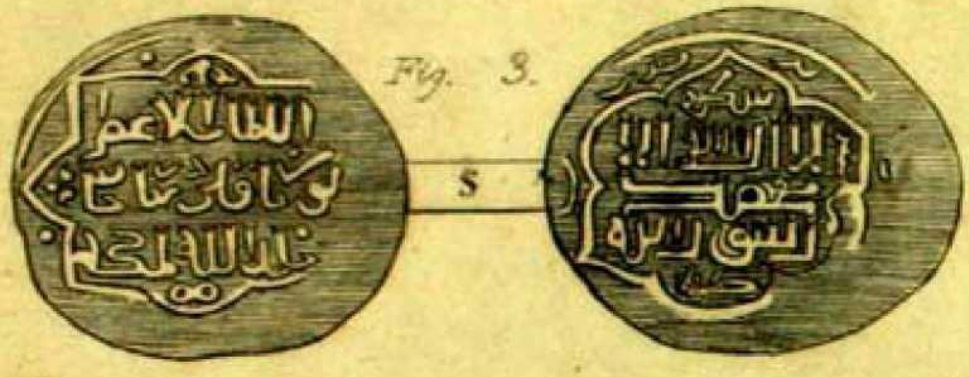


Fig. 4.

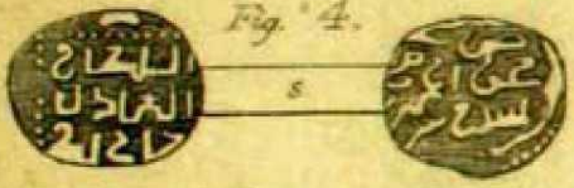


Fig. 5.

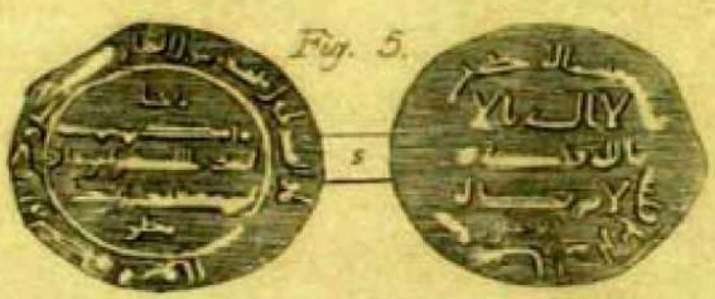


Fig. 6.

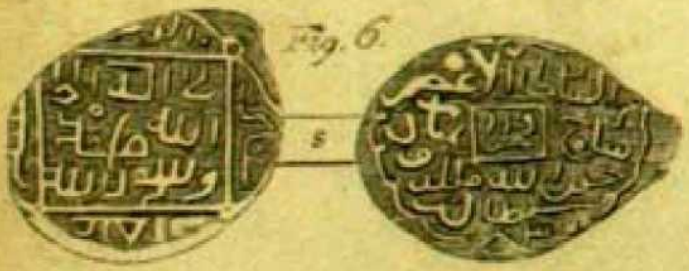


Fig. 7.

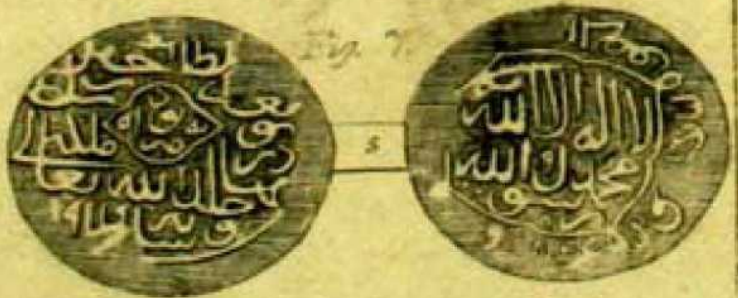
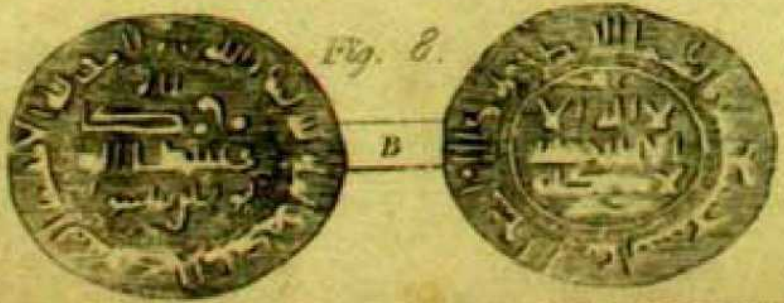


Fig. 8.



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JOURNAL

OF THE

ASIATIC SOCIETY.

No. VII.—1851.

An account of eight Kúfic Silver Coins.—By E. Thomas, *Esq. C. S.*

During Sir Henry Elliot's late march to Peshâwur, with the camp of the Governor-General, he availed himself of the opportunity to collect such ancient coins and medals as fell in his way, and I was subsequently permitted to examine these acquisitions in detail. The bulk of the collection naturally consisted of either purely local coins or mintages of proximate lands, but among the rest were found several specimens of Central Asian Kufic Coinages of various dates and kingdoms.

Monies of these classes are comparatively well known in Europe, in consequence of the number of pieces that find their way into our western world, viâ Russia, Turkey, &c., as well as from the full illustration these travellers receive from the willing labours of continental Numismatists.

In this country, medals of this description, though often falling into the hands of Coin-collectors, together with more easily legible and more valued specimens—are usually consigned to the space in each cabinet allotted to the class Ignoti, or permitted to remain in unhonoured association with the tenants of the miscellaneous drawer.

To remedy in a measure the reproach this state of things involves, and as introductory to the further study of similar classes of coins, I propose to describe briefly such of these pieces as have found a place in Sir H. M. E.'s collection—to offer an illustration of a type of each variety, and to introduce Indian readers to an acquaintance with the

valuable works of Continental Authors, who treat on subjects connected with this section of the Numismatic history of Asia.

From those Antiquaries, who are disposed to view this branch of study as *dry* and unprofitable—from those, who set their hearts upon the well-outlined and classic models of earlier days, I would claim a hearing, on the very valid plea, that of *all* divisions of Numismatic science, the Mediæval Moslem Coins the best fulfil the part of exact historical illustration; dealing in no mere repetition of standard types and emblems, seldom subject to ambiguous interpretation, their well covered surfaces convey in simple words, the precise information most prized by annalists: The name and title of the monarch, the city over which he ruled, and the fixed epoch of his sovereignty.

With this much of preface, I now proceed to give a slight sketch of the various treatises I have before alluded to.

The "Recensio" of Professor Frœhn is a most elaborate and comprehensive work printed at St. Petersburg, in 1826, giving oriental transcripts of the coin legends, with descriptions and translations in Latin. The publication is unfortunately wanting in illustrations, which renders it of less value to beginners, but as a Text Book, for those advanced in the art of deciphering Arabic coins, it stands to this time pre-eminent in its branch of the literature of the century.

Its printed contents amount to 743 quarto pages, besides which, it has extensive interpolations of starred repetitions of the regular numerical paging in order to admit of the introduction of a mass of additional matter met with during the course of publication.

The Indices alone are a book in themselves, extending over 70 pages of small type double-columns. But more fully to present to the reader's comprehension the number and variety of the subjects brought under review, I transcribe an outline of the "Conspectus Classium."

CONSPECTUS CLASSIUM.

Sectio I. Chalifæ primarii seu altioris ordinis.

Classis I. Chalifæ Umaijadæ Orientales.

——— II. Ditto Abbasidæ Baghdadici.

Sectio II. Dynastiæ orto duranteve Chalifatu 'Abbasidico Baghdadico natæ atque florentes.

Classis III. Varias dynastias simul comprehendens, sunt autem:

A. Chalifæ Umaijadæ Hispanici.

B. Alii Principes Hispaniæ.
1. Chalifa Hamudides.
2. Emirus Murciæ.

C. Imami Edrisidæ in Mauritaniâ.

D. Emiri Aghlebidæ.

Classis IV. Emiri Tahiridæ.
——— V. Ditto Soffaridæ.
——— VI. Ditto Samanidæ ('Alides, &c.)
——— VII. Chani Turkarum Hoei-he in Turkistaniâ.
——— VIII. Sultanus Subukteginides.
——— IX. Choresmis chahi.
——— X. Emiri Buweihidæ.
Princeps Sijarides.
'Alides.
——— XI. Emirus 'Okailides.
——— XI.A Emiri Merwanidæ.
——— XII. Sultani Seldschukidæ, Classis A and B.
——— XIII. Reges Ortokidæ, A and B.
——— XIV. Atabeki, Classis A, B, C and D.
——— XIV.A Chalifæ Fatimidæ, B Muwáh'hidi.
——— XV. Sultani Aijubidæ, Classis A, B, C.

Sectio III. Dynastæ vel sub vel post occasum Chalifatus 'Abbasidici Baghdadici natæ et pars hodiedum florentes.

Classis XVI. Sultani Mamluki, A, B.
——— XVII. Ditto Patani. XVII.A Princeps Senbedarius.
——— XVIII. Chani Hulaquidæ.
——— XIX. Ditto Dschelaïridæ.
——— XX. Ditto Dschudschidæ.
——— XXI. Giraï-Chani.
——— XXII. Chani Dschaghataïdæ.
——— XXIII. Ditto Scheibanidæ, &c.
——— XXIV. Imperatores Baberidæ.
——— XXV. Schahi Persiæ Sefidæ.
——— XXVI. Sultani 'Osmanidæ.
——— XXVII. Scherifi Mauritan, A, B.

Appendix 1. Christiani numos titulis Arabicis Signantes, Classis A, B, C.

Appendix 2. Numi Muhammedani incerti.

Professor Frœhn's miscellaneous Essays, relating to Mediæval Arabic Numismatics, are both numerous and important. Among the rest may be cited

1. Novæ Symbolæ ad rem Numariam Muhammedanorum, &c. St. Petersburg, 1819, pp. 47.

2. Numi Kufici ex variis museis selecti. St. Petersburg, 1823, pp. 84, 4 plates.

3. Die Münzen der Chane von ulus Dsehutschi's oder von der Goldenen Horde. St. Petersburg, 1832, pp. 75, 14 plates.

J. H. Müller's work, "De numis orientalibus in Numophylacio Gothano asservatis," (Gotha, 1826, 4to. pp. 187, and supl. 1841, pp. 61.) offers, in its first part, a complete Catalogue raisonné of all Kufic Coins previously published, together with the author's own new contributions, embracing the period from A. H. 77 to A. H. 663. The second part contains a continuation of the Mohammedan series down to 1232 A. H.

The compilation is one of much value as a book of reference where necessary, the various subjects are ably handled in detail and the whole undertaking is made complete by copious Indices and Lists of authorities both European and Oriental.

As connected with the general subject, I could cite an elaborate Monographie on the Coins of the Bouides by Lindberg, printed in the Mém. de la Soc. des Antiq. du Nord (1844): Some admirable letters published in the Paris Journal Asiatique by M. DeSaulcy, and many miscellaneous contributions of the same nature from time to time put forth in the form of detached letters by M. Soret of Geneva.

Marsden's "Numismata Orientalia" (Lond. 1823,) though designated by a late French writer as "si plein des inexactitudes, si de pourvu de critique," (Rev. Num. Paris, 1849,) is extremely valuable, in what nearly all continental publications fail in,—the number and perfection of its illustrations.

No. 1.

Hishám bin Abdalmalik. Wásit A. H. 121.

Obv. Area لا اله الا
الله وحده
لا شريك له

Margin. بسم الله ضرب هذا الدرهم بواسط سنة احدى وعشرين ومية

Rev. Area الله احد الله
الصمد لم يلد و
لم يولد ولم يكن
له كفوا احد

Margin. محمد رسول الله ارسله بالهدى و دين الحق ليظهره على الدين كله ولو كره المشركون

No. 2.

Mahdi. Baghdad, A. H. 162.

Obv. Area, as No. 1.

Margin. بسم الله ضرب هذا الدرهم بمدينة السلام سنة اثنين وستين ومية

Rev. Area محمد رسول
الله صلى الله
عليه وسلم
الخليفة المهدي

Margin. Korán ix. 33.

A second specimen struck at Basrah in A. H. 161, adds the name of محمد below the الخليفه المهدي

No. 3.

*Nóh bin Mansúr *Samání* (unpublished). Balkh, A. H. 377.

Obv. Area لااله الا
الله وحده
لا شريك له

Margin. بسم الله ضرب هذا الفلس ببلخ سنة سبع وسبعين وثلثماية
الله

Rev. Area محمد
رسول الله
نوح بن منصور

* As Sir H. M. Elliot's collection does not afford a good specimen of Samáni money, I have introduced this example from my own cabinet.

I also subjoin a description of a Samáni Coin in Mr. Bayley's collection, which is, as far as I can ascertain, quite new in its type, and in spite of its defective preservation likely to prove of much interest in the unusually prominent association of the name of Nasr bin Ahmed, the founder of the line, with that of the reigning sovereign, Nóh bin Mansúr.

Margin. مما امر به الامير السيد الملك المنصور ايده الله

Copper. Nóh bin Mansúr. Balkh, 374, H.?

Obv. Area a Circle, described within a square.

containing the name of نصر بن احمد

Interior Margin. لا اله الا الله وحده لا شريك له نصر من الله

Exterior Margin. الفلس ببلخ سنه اربع وسبعين وثلثماية

الله

Rev. محمد

رسول الله

الطايع لله

نوح بن منصور

Margin. مما امر به الامير نصر بن احمد [مولي] امير المومنين

See also, Die Münzen, p. 51, Tab. xiv. Fig. 22. Recensio, No. 322, c, p. 585, and Jour. R. A. Soc. London, No. XVIII. p. 301.

No. 4.

Nasr bin Ali *Ailek* (unpublished). Boḳhárá, A. H. 394.

Obv. Area لا اله الا

الله وحده

لا شريك له

ابو علي

Margin. بسم الله ضرب هذا الدرهم ببخارا سنه اربع وتسعين وثلثماية

Rev. Area بادشاه

محمد رسول الله

القادر بالله نصر الحق خان

المويد العادل ابلك

نصر

Margin. Korán ix. 33.

A second specimen reads, ناصر الحق خان

No. 5.

Jellál-uddín Muhammed Jání beg Khán. Kwáriym, A. H. 743.

Obv. السلطان العادل جاني بك

Rev. ضرب خوارزم في سنه ٧٤٣

Frœhn, pp. 225, 256, &c.

No. 6.

Búyán Kulí Behádur Khán. Kish, A. H. 753.

Obv. Area سکه ؟

لا اله الا
محمد
رسول الله
کش

Margin.—ثلاث ؟ شهور [سنة]

Rev. السلطان الاعظم
بویان قلي بهادرخان
خلد الله ملکه

A somewhat similar coin has been engraved in Pl. XXI. Fig. 1, Tom. IX. Mémoires de l'Acad. Imp. des Sciences St. Petersburg. The Russian specimen has the words سکه کش ٧٥٣ run in between the lines of the *Kalimah* on the Obverse. It has no marginal inscription. A coin of the monarch is engraved in Pl. XV. Fig. 7. Die Münzen.

No. 7.

Sháh Rokh. Subzwár, A. H. 839.

Obv. Area سبزوار

Margin. السلطان الاعظم شاه رخ بهادر خلد الله ملکه وسلطانه ٨٣٩

Rev. Area لااله الا الله محمد رسول الله

Margin. ابو بکر عمر عثمان علي

"Class XXIII. of Frœhn Numi Chanorum Scheibanidarum, Dschanidarum, &c.

"in universa Bochariâ Magnâ vel in ejus provinciâ aliquâ."

No. 8.

Abdul-Latíf Behádur Khán.

Obv. Area, "The Kalimah."

Margin. امیرالمومنین عمر امیرالموم

Rev. الخاقان العادل الملك الكامل عبد اللطيف بهادرخان

خلد الله تعالى ملکه و سلطانه [ضرب] سرمرقاده (سمرقند)

Frœhn, p. 439, gives a dated coin of this Khán of the year A. H. 953.

No. 9.

Sháh Morád* (New unpublished.) A. H. 1199?

Obv. Area. "The Kalimah." Margin, &c.
المرتضي ابا بكر

Rev. Area—مراد به نوة بهادر ابوالغازي السلطان—سلط
—خلد الله تعالي ملكه وسلطانه ١١٩٩ ؛

Notes upon a Tour through the Rájmahal Hills, by Captain WALTER S. SHERWILL, *Revenue Surveyor.*

The extensive and hitherto unexplored tract of hilly country, extending from the banks of the Ganges at Sikrigallí, in Latitude 26° 10′ North, and 87° 50′ East Longitude, to the boundary of the district of Birabhúm, a distance of seventy miles, and known as the Rájmahal Hills, forms the most north-easterly shoulder or portion of the Vindhya Mountains; which range, extending from near the mouths of the Nerbudda and Taptee rivers in Candeish in Longitude 73° 30′ and Latitude 21°, and after having travelled eight hundred and fifty miles in an east, north-east direction, or quite across India to Sikrigallí, here turns to the south, passes through the districts of Birabhúm, Bardwán, Midnápur and Cuttack and eventually merges into the Ghats or Mountains running parallel to the Coromandel Coast.

Although every European proceeding up the Ganges passes immediately under these hills, and although they are only two miles removed from the banks of the river, the hills and their contained valleys are not only unexplored, but it is not even generally known that the hills are inhabited; the general received opinion being that the Rájmahal Hills are an uninhabited jungle; that such is not the case I hope to show, having penetrated into almost every valley and climbed all the principal hills, during the progress of the survey under my charge.

The Hills are inhabited by two distinct races, the Mountaineers or a race living on the summits of the hills and who are, with rare exceptions, never found residing in the valleys; and the Sonthals who reside in the valleys. Both these races have distinct languages, neither

* Sháh Morád was the father of Seyd Emír Haidar, see p. 443, Frœhn.

of which are understood by the Hindustáni man, nor are the two languages understood by the two races.

The Sonthâls are interlopers as will be explained hereafter, the hill men are the original inhabitants, whose history may be summed up as follows.

From the days of the Muhammadan kings to 1764 A. D. these hill people were the scourge and terror of the neighbouring districts, from whose inhabitants they levied black mail, and when that could not be obtained, armed bands fully equipped with powerful bamboo bows and poisoned arrows, descended from the hills, murdered all who opposed their progress; they pillaged the country far and near, carrying away grain, salt, tobacco, money, cattle and goats, or indeed any thing they could lay their hands upon, and, retreating to their jungly fastnesses where no one dared follow them, defied their victims.

Cases have been known where the zemindars of the plains have, for the sake of inflicting an injury on a neighbouring zemindar with whom they have been on bad terms, invited the hill-men to descend from their hills and plunder his land and crops; the inviting zemindar offering the hill-men a free and safe passage through the plains as far as the spot to be ravaged, but several cases of treachery on the part of the inviting zemindars ending in the death of more than one hill chief, at last broke off all connexion with, and destroyed all confidence between, the hill-men and the zemindars.

This unsatisfactory state of affairs lasted for some years after the British Government had taken charge of Bengal and Behar; and as the constant descents of the hill-men threatened to annihilate the ryots in the neighbourhood of the hills, and as no boats could moor on the southern bank of the Ganges without being robbed, and as the dák runners conveying the mail between Calcutta and Benares were constantly murdered at the foot of the hills, and the wallets robbed of their contents, for in those days the only high road to Benares from Calcutta passed through Rájmahal, Sikrigalli and Telíágarhi, Government at last tried what force would do; troops were sent against the hill-men, but with a very doubtful success; the jungles on the hills being exceedingly dense, there being no roads, no supplies and no chance of the hill-men coming to an open fight, no impression could be made upon them; the Muhammadans, before the English, had

tants of the jungleterry of Rájamahal, who had long infested the neighbouring lands by their predatory incursions, inspired them with a taste of the arts of civilized life, and attached them to the British Government by a conquest over their minds; the most permanent, as the most rational mode of dominion."

The tomb whence this Epitaph is copied, was erected to the memory of Mr. Cleveland at Bhágalpur, by order of the Governor General and Council of Bengal, in honor of his character and for an example to others; and bears date 1784.

As disputes from time to time still occasionally occurred between the hill-men and the zemindars at the foot of the hills, relative to their proper boundaries and the right of grazing, cutting wood and other matters, Government in the year 1832, deputed Mr. John Petty Ward, of the Civil Service, in company with Captain Tanner as Surveyor, to demarcate a boundary that should secure to the hill-men the undisputed possession of their hilly tract, and effectually separate them from the lowlanders; this, after an immense deal of labour,—for the whole of the boundary demarcated, and which measures two hundred and ninety-five miles in circumference, was entirely through heavy jungle,—was accomplished, and large masonry pillars erected at convenient distances, thus enclosing with the exception of a few outlying hills to the south, the whole of the Rájmahal Hills; all land within the pillars was claimed by Government, and by Government given over to the hill-men to be held by them as long as they behaved themselves in an orderly manner; all without the hills belongs to the various Parganáhs of the district Bhágalpur, bordering upon the hills.

All land within the pillars bonâ fide occupied by the hill-men pays no rent or tax to Government; but as the hill-men cannot be induced to cultivate the valleys, nor the extensive tract of level land lying outside the hills but within the masonry pillars and named the Dámin-e-Koh, or skirt of the hills, Government permitted a wandering race of people named Sonthâls, whose country extends from Cuttack across Mánbhúm, Chotá Nágpur, Házáribágh, Palámow to Rewáh, to locate themselves upon the land repudiated by the hill-men, paying at the same time a light land tax for the ground so occupied.

In process of time these Sonthâls increased in numbers, both by births and immigration, until their numbers became so numerous and

the land that was being cleared of forest and that had been cleared so extensive, that Government appointed Mr. James Pontet of the uncovenanted Civil Service, Superintendent of the whole of the hills, under the Title of "Superintendent of the Dámin-e-Koh," with power to guard the interest of Government by making favorable land settlements with the Sonthals and to collect the rent.

Mr. Pontet took charge of his duties in 1838, the yearly ground rent then being two thousand rupees, and the number of Sonthal villages amounting to about forty, with a population of about three thousand souls; but now in 1851 A. D. only thirteen years after taking charge, Mr. Pontet has, by judicious management, raised the rent to Company's Rupees 43,918-13-5½, and the number of Sonthals who have been induced to immigrate into the valleys and into the Dámin-e-Koh amounts to 82,795 souls, contained in 1,473 villages; 1164 of which pay rent, and 309 of which are free; the latter not having been under occupation the three years of grace considerately allowed to each new village to enable it to clear the forest and break up the land previous to its being brought on the rent-roll.

The boundary of the Dámin-e-Koh as defined by Mr. Ward, encloses an irregular-shaped figure, as it generally follows the shape of the hills; the greatest length from the north to south is seventy miles; the greatest width, which is near the centre of the hills, is thirty miles; whilst to the north and south it is only sixteen miles in width; the area contained within its limits is 1366.01 square miles, of which about 500 square miles are level ground situated within and without the hills.

Of the level ground 254 square miles are cleared of forest; 157 square miles of which are under cultivation by the Sonthals, and 97 square miles are lying fallow.

On the summits and sides of the hills about 28 square miles are under cultivation by the hill-men, and the same area is lying fallow; this allowance gives 20 acres of cultivation and 20 acres of fallow to each village which is the approximately ascertained area.

"The hills" as Dr. Buchanan observes "are no where of sufficient height to reduce the temperature of the air in any considerable degree, and the reflection of the sun's rays from their rocks, and the shelter from the winds that their forests afford, renders the part among the hills hotter than the plains, so that the mountaineers when in the open

country complain much of cold, and the sepoys of the tribe are uncommonly subject to rheumatism."

In the centre of the hills is a fine level valley 24 miles in length and 5 in width, full particulars of which are recorded in the Journal at the end of these notes; it is drained by a deep nalláh, the Morel or Morung, flowing from the north, and another, the Jamúní or Gúmání, flowing from the south, these two nalláhs unite in the valley, and leave the hills on the eastern boundary.

The Banslui Naddi—a fine broad stream flowing from west to east,—completely intersects the hills by flowing through the Pachwárá Pass.

The Brahmaní Nalláh forms the southern boundary of the Dámin-e-Koh. Besides these four streams there are numerous smaller streams flowing from every ravine and valley affording an abundance of pure, fresh water.

To the natives of the plains the climate of the hills during several months of the year is most fatal; jungle fever carrying them off in a few hours; the bad season commences with the westerly winds in March; the suddenness of the attack is appalling, as long as there is no wind the healthiness of December, January, and February is prolonged to March, but the first high wind arising in March is the messenger of death to the natives of the plains; I have seen seven of my servants struck down in one day with fever; the weather had been warm and the air particularly free from agitation; but the day they were taken ill a strong west wind set in and by the evening they had fever.

In the early part of the survey of the hills and from being ignorant of the dangerous nature of the jungle during the month of March, I lost thirty-four natives of the plains who were engaged in the survey; they all died of jungle fever; many others were attacked, but escaped; out of one party consisting of eleven men, seven were taken ill and four died within a few days, they were Muhammadans; two horses that were with the party were also taken ill at the same time and died. The months of April, May and June are also unhealthy for the lowlanders, but September and October are deadly.

With very few exceptions all the natives that recovered from the jungle fever were subsequently sufferers from enlarged spleens.

The hill-men and Sonthals suffer but little from this fever, for when

attacked by it, it assumes a much more mild form and is accompanied by ague.

The soil in and around the hills differs widely in different localities; the large central valley and spots outside the hills possess a fine black soil, known as the Regur or cotton soil, it is the same soil that is found in the Dekkan, Bundlekund and in the Saugor and Nerbuddah Territories; I have seen the soil in all the above mentioned localities, where it is always found associated with the same rocks as appear in the Rájmahal hills, viz. Basalt and Laterite. Besides the cotton soil, light colored loams, clayey soils, gravelly and sandy soils also appear.

As on entering the hills the Sonthál is the first class of native that is met with, I proceed to describe him, his manners, and some of his most remarkable customs.

The Sonthál or lowlander is a short well made and active man, quiet, inoffensive and cheerful; he has the thick lips, high cheek-bones and spread nose of the Bheel, Kole, and other hill tribes of southern and central India; he is beardless or nearly so; he is moreover an intelligent, obliging, but timid, creature, very cowardly towards mankind, but brave when confronted with wild animals; the Sonthál is an industrious cultivator of the soil, and as he is unfettered with caste, he enjoys existence in a far greater degree than does his neighbour the priest-ridden and caste-crushed Hindu.

The Sonthál eats his buffalo-beef, his kids, poultry, pork, or pigeons, enjoys a hearty carouse enlivened with the spirit "Pachúí" and dances with his wives and comrades to express his joy and thankfulness; and when the more substantial good things of life such as meat and poultry are scarce, he does not refuse to eat snakes, ants, frogs and field-rats.

The cow is also eaten by the Sonthál as well as all other animals, whether slain, or those that have died a natural death, or that have been shot or torn by wild animals.

The women are fat and short and although not pretty according to our European idea of beauty, have a very pleasing expression of countenance, with none of the affected or mock modesty of the Hindu.

The Sonthál is a larger and taller man than the hill-man, and generally stands five feet six inches in height, and weighs about eight stone.

With the exception of the larger villages in the central valley where all the land is highly cultivated, the Sonthál villages are generally

buried in thick jungle, with small cleared patches of ground near the village, bearing crops of rice, Junerá, (Indian corn,) mustard and several kinds of pulse. The villages are composed of upright log huts, with thatched roofs, arranged so as to form a long street one house deep. Almost to every house is attached a pig-stye, or a dove-cot; and bullock or buffalo sheds are distributed throughout the village.

The sides of the street are plentifully planted with the Sohajná (Hyperanthera morunga) whose mutilated branches proclaim the Sonthál's fondness for its pungent alburnum, which is eaten with their food. Their food consists principally of Junerá (Sorghum vulgare), Indian corn, seasoned with the Byre (Ziziphus jujuba), chillies, mustard oil, Sohajná alburnum, or onions; and accompanied with eggs, poultry and occasionally swine's flesh, goat or kid; the supply of meat depending principally upon the sacrifices. A large white bean as well as the petal and legume of the Bauhinea variegata are also used as vegetables.

In every village there is a small thatched roof supported upon one or more wooden posts; the roof gives cover to a small earthen platform raised a foot above the ground; this spot is termed the Mangi; at this spot is buried the memory of some former Mangi or village-governor, who, for his good conduct, abilities, or for some other good quality, has been, with the unanimous consent of the villagers, canonized; and the spot named after him; thus at Jhilmilli *Bora Mangi* is the name of the village Sanctum. At these spots the head-men of the village meet, talk over the affairs of the village, threaten the unruly, punish the guilty, collect the rents and sometimes make small votive grain offerings to the defunct Mangi, which offerings are placed on the ground under the roof, when not occupied by the villagers the holy spot is generally occupied by pigs, dogs or cattle.

In some of these Mangis I have seen pots of water fixed on a wooden stand or depending from the roof; their use or meaning I failed to ascertain.

The working dress of the male Sonthál consists of a mere strip of cloth, not passed round the body but being fastened to a hair or cotton string that goes round the loins, it is passed between the legs thus merely hiding his nakedness; the women on the contrary are well clothed with an ample flowing cloth, one end of which is fastened round the waist the other is passed over the left shoulder leaving the

right shoulder, part of the breast and arm entirely free, and is allowed to hang down in front; when the women can afford it, they load their limbs with zinc and bell-metal ornaments; the men wear small zinc earrings, a few finger rings, and occasionally an iron wrist bangle; both male and female tie their long hair into a knot on the crown of the head.

The religion of the Sonthals consists in prayers, sacrifices and religious dances, the whole of which are generally performed and attended to by the votaries whilst in a state of intoxication.

The only prayer I have heard of amongst these people is a supplication to an invisible and powerful spirit for protection from famine and sickness; from disease amongst their cattle; for defence against wild animals, especially the tiger; and that their children may be defended from all dangers, amongst which are enumerated the attacks of wild animals, snake bites, scorpion stings and all kinds of accidents.

This simple prayer points out in a forcible manner the condition of the Sonthál and his wants; he first prays for protection from famine; for as he is an inhabitant of the jungles and generally cut off from all communication with his fellow-men, a failure of his scanty crops would be ruin and starvation to him.

Their plough cattle being the grand instruments by which their crops are insured to them, and as a murrain or a total destruction of these animals would leave the Sonthál in a starving state, his prayers are also directed to their preservation.

That a portion of their supplication should be directed against the attacks of wild animals is not surprising, for the Sonthál being a denizen of the forest as before observed, he is himself as are his cattle in constant danger from the attacks of tigers, bears, leopards, and wolves; and his crops are also in danger from the ravages committed by wild elephants, buffaloes, monkeys and deer, and as the Sonthál never manures his land and as he generally occupies an indifferent soil, a constant change in his abode is necessary, and thus in his onward move, he constantly comes in contact with these his great enemies; the Sonthál however with a proper spirit, does not supplicate without endeavouring to help himself, and no opportunity is allowed to escape of destroying these animals, which is effected with bows and arrows poisoned and not poisoned.

Children being the Sonthâls' great pride, comfort and assistance, are not forgotten in their short prayer. Sonthâls in general have large families, averaging perhaps eight children to each couple; the male children plough, herd the cattle, reap the harvest, build and repair the family houses, make the carts and ploughs; distil the spirit Páchúi from rice, and perform all out-door work; whilst the female children husk the junerá and rice; express oil from the mustard seed, cook the household food, attend the markets when near one, look after the poultry, pigs, goats, and pigeons; and when the parents are old and infirm the children become their support.

Almost all nations on earth, savage or civilized, appear to have an intuitive feeling or knowledge, that blood is required to be shed for the propitiation of sins; nor do we find the Sonthál ignorant of the fact, and in order to propitiate the invisible spirit they freely sacrifice the buffalo, pig, goat and poultry, the blood of which animals is sprinkled over the offerings made by the worshippers.

Outside every Sonthál village a spot is set apart for offering up sacrifices which are made at all times of the year and by any one having a request to make of the invisible spirit; the spot selected is generally a small patch of Sakua jungle that has been spared when the forest was removed from the neighbourhood of the village, in this secluded grove small stones are set up at the foot of the trees and besmeared with red paint, and generally two upright sticks are stuck in the earth connected by a horizontal one, under or near this group of sticks the victims are slain with a sword, and the blood sprinkled upon the offerings that have been placed under the bar on the ground by the villagers; the offerings consisting of small conical-shaped leaf bowls or cups filled with either rice, junera, or Indian corn, mixed with milk, ghee, spirits or water. The flesh of the victims is eaten by those invited to the feast, which is invariably more or less a scene of debauchery terminating in a wild and most extraordinary dance A very extensive dance which I witnessed in the hills took place by torch light at midnight during the month of April, at which about five thousand Sonthâls were present, these dances are performed both by night and by day; at the present one about four hundred women danced at the same time.

A lofty stage is erected in an open plain upon which a few men

seat themselves, they appear to act as guides or masters of the ceremony; radiating from this stage which forms the centre of the dance are numerous strings composed of from twenty to thirty women, who holding each other by the waistband, their right shoulder, arm and breast bare, hair highly ornamented with flowers or with bunches of Tussur silk dyed red, dance to the maddest and wildest of music drawn from monkey-skin covered drums, pipes and flutes, and as they dance, their positions are postures which are most absurd, are guided and prompted by the male musicians who dance in front of and facing the women; the musicians throw themselves into indecent and most ludicrous positions, shouting and capering and screaming like madmen, and as they have tall peacock feathers tied round their heads and are very drunk the scene is a most extraordinary one. The women chant as they dance and keep very good time in their dancing by beating their heels on the ground, the whole body of dancers take about one hour to complete the circuit of the central stage, as the progressive motion is considerably retarded by a constant retrogressive one. Relays of fresh women are always at hand to relieve the tired ones.

The men swear by the tiger's skin, but swearing them at all is unpardonable, for the truth is by a Sonthal held sacred, offering in this respect a bright example to their lying neighbours the Bengalis.

The Sonthals are governed by Pergunnites and by Mangis chosen by themselves from amongst their numbers; the Pergunnite has charge of perhaps twelve villages, from which he collects the rent and makes it over to the Superintendent, the Mangi has immediate charge of his own village and is answerable for all the misdeeds of his brethren, but as they are in general an orderly race of people their rulers have little more to do than bear their honors and collect the rent.

The Sonthal will take service with no one, he will perform no work except for himself or for his family and should any attempt be made to coerce him, he flies the country or penetrates into the thickest jungle, where unknown and unsought, he commences clearing a patch of ground and erecting his log hut.

The preliminary step to a Sonthal's marriage is perhaps as extraordinary a custom as any ever heard of amongst half savages; it is, that during a certain festival named Bandana, which is held in the month of January and which lasts six days, all the unmarried candidates for

matrimony of both sexes are permitted to have promiscuous intercourse with each other during these six days; at the close of which, the whole party are supposed to have paired off as man and wife; feasting and drinking according to the ability of each couple closing the ceremony.

The Sonthals are very expert with the bow and arrow, so expert that nothing with life is to be found near their villages when of any standing; I have seen the bear fall an easy prey to their well planted arrows, also a hare knocked over when at full speed; birds on the wing I have also seen killed, but with blunt or knobbed arrows; their bows are either made of Dhamin wood or bambus, the string is generally made of bambu or of the fibre of the Bauhinea scandens; the arrows are made of a light reed, tipped with barbed iron-heads and feathered with the brown feather from the peacock's wing.

The hill-man is much shorter than the Sonthál, of a much slighter make, is beardless or nearly so, is not of such a cheerful disposition, nor is he so industrious; his great delight appears to be attending the neighbouring markets where decked out with beads and chains, his hair fastidiously combed, oiled and ornamented, he will in company with his friends both male and female, while away the greater part of the day. Labour is the hill-man's abhorrence but necessity compels him to cultivate a small portion of the land for his actual existence; beyond this trifling labour he never exerts himself. He will nevertheless fish, or hunt or roam over miles of the forest searching for honey-combs, wild yams, and other edible roots; he will travel many miles to get a shot at a deer or to secure a peacock, such labour he considers in the light of amusement, but to have to clear away the forest for his crop he considers a great hardship; but clear it he must, and the hill-man generally chooses the most precipitous hill sides as the ground best fitted for his crops. In these spots an iron shod staff or a pointed stick hardened by charring is used instead of the plough—with this implement, holes are made in the soil at the distance of a foot or less from each other, into which are dropped a mixture of the following seeds, Indian corn, junera, bora beans and the seeds of several small pulses. The tall and robust Indian corn and junera form an ample support to the twining bora bean, which in its turn affords a beneficial shade to the more delicate pulses at its feet.

The heads of the Indian corn when ripe are stocked in bambu granaries of various shapes and which are raised off the ground on posts; whilst those required for immediate use are strung up to the roof of the huts, and as required for food are submitted to the operation of being husked in a wooden mortar; of the meal of this grain a thick and nutritious hasty pudding is made which forms the principal food of the hill people.

The junera is treated in the same way, but the bora bean, kam ruhur and pulses are beaten out either by rubbing with the hand or by beating them on a log of wood.

Religion of the Hill People.

For much of the religious history of these people, I am indebted to a paper published in the 4th volume of the Asiatic Researches by Lieutenant Shaw, and dated A. D. 1792.

The religion of the Rájmahal hill people consists in the adoration by prayer of an invisible spirit named Bedo Gosain, who made heaven and earth, and who is invoked by several means and through the medium of various gods, visible and invisible; the visible gods being wooden images, stones and trees, to which may be added heaps of bones and skulls of wild animals; sacrifices and numerous vicariously performed ceremonies being the means of invoking Bedo Gosain.

They inculcate that men should be kind to each other, especially to the poor, and that men should labour for their food, that men should not murder, nor punish without cause, that no one should mock or oppress the poor, the lame, the blind or the unfortunate; adultery and fornication are forbidden, the punishment for disobedience to the commands of Bedo Gosain being either temporal punishment of the souls being condemned to inhabit some portion of the vegetable kingdom for a certain number of years, or to suffer the eternal punishment of being bound and cast into pits filled with fire and maggots.

The self-murderer is expelled from the presence of Bedo Gosain for ever.

The reward for a good life in this world, they believe will be, that after having enjoyed a short but happy residence with Bedo Gosain in heaven, they will be born a second time on earth of woman and that they will be exalted to posts of great honor, possessing an abundance of worldly goods.

The above verdicts for good or evil, are to be pronounced when judgment is held before Bedo Gosain.

They also believe in angels or messengers both good and evil, and that they are the especial messengers of Bedo Gosain. Their officiating priests or oracles are named Demánú; any one fancying the calling appears to take it up, no preparation beyond fasting being requisite to constitute such an official; they foretel events, and threaten the unruly, comfort the afflicted, pray for all, promise blessings to those seeking them, and answer all difficult questions regarding futurity; they kill the sacrifices, regulate the religious dances, feasts, and ceremonies, and lastly they exorcise devils and evil spirits.

Marriage.—A man may marry as many wives as he can conveniently manage to support; four wives appearing to be the maximum. A young man having taken a fancy to a young girl of adult age, shows his love for her by an exchange of presents, walking with her, giving her toddy to drink and by sleeping on the same bedstead with her; should any indiscretion arise previous to marriage from the young couple sleeping together, they are considered disgraced and are visited with fine. A few presents to the girl's father, a feast and a sacrifice of a goat or some poultry complete the matrimonial ceremonies.

A man dying and leaving widows, they are, if agreeable to the arrangement, married to their late husband's younger brothers, or cousins, or to any one else they fancy.

Adultery and fornication on the part of either sex is punishable with fine, and the ill effects effaced by sacrifice and feasting.

Witchcraft and sorcery are firmly believed in; the test, as is usual in almost all countries of the world being fire. The suspected person being obliged to pass hot irons over his tongue, hands and feet, and as human flesh must suffer from the contact of red hot-iron, conviction is a matter of course, and gives an opportunity for a sacrifice and the usual accompanying feast.

Upon the birth of a child the mother keeps to her house for five days attended upon by her husband; on the fifth day the child is named by the parents.

The dead are buried.

The men swear by salt.

The whole tribe are without any caste; partaking of all sorts of food even to the flesh of the cow and swine.

The foregoing Introductory Remarks were written as explanatory of the following Journal.

Journal of a Tour through a portion of the Districts of Moorshedabad, Birbhum and the Rájmahal Hills, in the District of Bhagalpur.

December 12th, 1850.—Left the military Station Berhampur situate on the left bank of the Bhagarutti ; direction south west eight miles to Gow-kurn. Cross the Bhagarutti a little above the Station in ferry-boats. The banks of the river present numerous strata of a grey alluvial soil alternating with strata of white sand ; on the right or western bank saw a stratum of paludina, a fragment of yellow sandstone and old pottery, five feet below the surface of the country. The sand of the river is freely mixed with silvery and black mica, and tourmaline, but no pebbles ; planorbis plentiful on the banks.

The road for six miles is over a deep alluvial soil, lying very low, very damp, and abounding in marshes ; the number of birds seen in this low tract where there is an abundance of insect-life and fish, is very great ; consisting of fishing eagles, crows, ravens, paddy-birds, mohoka, golden oriole, snipe, mina, koel, larks, king-fishers of several kinds, amadavats, crested bulbuls, jacanas, sparrow-hawks, peewit, plover, king-crow, hoopoe, brahminee kite, storks, kites, snippets, Pharoah's chickens, whistling teal, grey and black partridge, terns, finch, Pondicherry vulture, brown vulture, swallow, pagla, wagtail, bee-eater, woodpecker, blue pigeon, kokleet, doves, jay, heron, cormorants and numerous wild fowls.

At the sixth mile or at the village of Nowgong the country rises suddenly and is undulating, the alluvial soil ceases ; kunkur (nodular limestone) and pisiform iron ore become common ; the colour of the soil changes as well as the feeling, if not the temperature of the air, which is more dry and bracing than at Berhampur, nor is the change of soil less remarkable, as yesterday I thrust a walking stick eighteen inches into the Berhampur alluvial soil, which same stick made no impression to-day upon the hard dry soil of Nowgong. Looking east, the low alluvial tract in which Berhampur is situated appears about one hundred feet below Nowgong ; it is to this low marshy country which extends from Rájmahal to Nuddya, a distance of one hundred

and twelve miles, that tradition assigns the former bed of the Ganges before the formation of the Podda or the present Ganges below Rájmahal; and before the existence of the present Bhagarutti. This lowland is at present drained by the Jeeoonthee Nullah which falls into the Bhagarutti a little below Berhampur.

The principal crops of the alluvial soil are rice and mulberry; the latter is cultivated for the use of the worms which produce the Berhampur and Cossimbazar silk.

Principal crop of the higher land is rice; principal trees, Pipul, Burgut, Babul and Nim; bamboos are also common.

A square tank at Gowkurn presents a goodly supply of elegant water-plants, scarlet and white lotus, water-creepers, and numerous handsome water-flowers whose names I am unacquainted with; large ampullaria are common in the tank.

December 14*th*.—Direction west, eight miles to Jamukandi, at the second mile cross the Dwarka, a shallow muddy stream flowing easterly from the Rájmahal Hills, stream barely perceptible; one of the numerous branches of the More river which is one of the drainers of Birbhum and southern pergunahs of Bhagalpur, joins the Dwarka at the ferry, its bed was dry and sandy, the sand composed of grey and white quartz and an abundance of schorl from the gneiss and granite formation of Birbhum, and also iron ore. The Dwarka is sandless with steep banks of a rich loam, at the foot of which lying scattered about were numerous dead specimens of the pearl-bearing unio and palludina.

The pearl-bearing unios are collected from the Jheels and marshes in great numbers, a small proportion only bear pearls, which are of a very good colour and size; a large pair sell for 250 Rupees. The shells are burnt for lime.

After crossing the Dwarka the country is highly cultivated and beautfully wooded; the crops rice, sugar-cane, linseed, mulberry and small patches of wheat. At the several villages the chunderkees or large circular bamboo frames or stands covered with thousands of yellow silk cocoons were drying in the sun.

Jamukandi is a large town on the banks of the branch of the More river that falls into the Dwarka and stands on the common boundary of Moorshedabad and Birbhum, the town boasts of a very

fine and extensive masonry built bazar, ornamented in a fantastic manner by about fifty figures, painted on boards by native artists, as large as life, representing the dress of English females in the reign of George the Second. There are numerous tanks, brick buildings and gardens, besides numerous groves of cocoanut trees swarming with monkeys.

A quantity of steatite plates, bowls, and dishes were being worked up in the bazar that are brought in a rough state from the district of Bancura situate to the south of the Damuda, coal fields on the granite and syenetic formation.

A quantity of the Morinda tinctoria (al) is grown at this place, it is used for dyeing the karwa or red cloth used principally in tent-making.

15*th December*, 1850.—Direction west, 10 miles to Andhi.

After leaving Jamukandi the country rises rapidly all the way to Andhi which is about eighty feet higher than Jamukandi. The whole country passed through this march was under ripe rice cultivation and mulberry and moderately wooded.

In the tanks saw ampullaria, limnea, paludina, cerithium, and succinea.

BANKS OF KUNKUR ARE NUMEROUS.

16*th December*, 1850.—Direction west, distance ten miles to Synthia situate on the south or right of the More river. Country still rising, highly cultivated and beautifully wooded with mango groves. Synthia is situated on a high gravel bank which forms at this spot the eastern boundary of the great iron beds, which extend many miles both north, west and south from this place.

To the north of the village a good section has been effected by the water of the More in the high gravel bank, which affords the following appearance; on a level with the bed of the river the bank is composed of a very tough arenaceous conglomerate, composed of pink quartz sand connected with a ferruginous cement, capped by a layer several feet thick of a coarse gravel composed of rolled pieces of white and translucent quartz, pisiform iron ore and a few pieces of decomposing felspar, the whole firmly embedded in a ferruginous sand, which is again covered with nodules of kunkur. The bed of the river is in places quite black with magnetic iron dust which clings in clusters to a magnet.

The More is about half a mile across with a small but brisk stream of pure water; the southern outliers of the Rájmahal hills are visible to the north-west, distant twenty-four miles.

In the village I saw large heaps of coal that had been brought by a zemindar from the Ajye river, distant forty miles, to be used for burning bricks.

17th December, 1850.—Direction west, ten miles to Sury, the civil station and capital town of the district Birbhum. The whole march lay through a highly cultivated and well wooded country.

Sury is a moderate sized native town situate on an extensive ridge of gravel, composed of quartz felspar, silvery mica and a great abundance of pisiform iron ore; the whole lying upon granite, which is seen cropping out from the gravel one mile north of the station.

As far as the eye can see to the north, the country appears composed of long undulating ridges, running east and west, well wooded and backed by the Rajmahál Hills.

18th December, 1850.—Direction north-west eight miles to Naggulia. As before observed the granite is met with one mile from the station, it has about seventy-five per cent. of felspar in its composition, with translucent quartz and silvery mica. Pass through Ratangarh a small village on the right bank of the More, but which in Arrowsmith's large map is made to appear on the left bank; at this village I passed under two large kuchla or Strychnos nux vomica trees, whose branches were bending under the weight of large clusters of their tempting orange looking, but deadly poisonous fruit.

Naggulia is situated on the summit of one of the numerous ridges that generally extend throughout the western portion of the district; they are in general from ten to fifteen miles in length, and from thirty to fifty feet in height; the valleys between averaging from the crest of one ridge to the crest of another about five miles in width; the ridges are invariably covered with a forest of sakua trees, a species of shorea, and assan, with naked rocks of quartz, felspar, gneiss, dykes of greenstone, hornstone, occasional actinolite and nodular iron stone, the latter disintegrating, forms the pisiform iron ore so plentifully found spread over the country, and which forms the finest natural roads possible to conceive; unlike kankar roads which are always liable after continued rain to run into holes from the pounded lime re-crystallizing, these

roads are improved by rain, it being the agent by which the red oxide which is always forming on the surface of the ore by the absorption of oxygen is spread over the incoherent particles, which are soon united into a hard mass.

Three miles in an easterly direction from Naggulia on the left or northern bank of the More River and opposite the village of Kattangá and near a village named Tangsuli, is a small bed of sandstone with minute threads of coal and an abundance of bituminous shale wedged in between gneiss rocks.

Three miles north of Naggulia are two small gneiss hills named Parjore; from the summit of which there is a good view.

Rajmahal Hills, 16th January, 1851.—Direction west six miles to Sadipur Buharow. The road is along the right bank of the More River through Sakua Jungle and cultivation; passed some fine Strychnos and soondree trees, from the latter is obtained a bright red dye chiefly used in dying wools and silk; the bushes on the banks of the River were laden with Abrus precatorius, bearing the pretty red and black bead-like seed. At the second mile crossed the More, a broad river about five hundred yards in width during the rainy season, but now a wilderness of sand with a small but cheerful stream of water.

At Kumardah on the left bank of the river about eighty light boats are built during the year, they are then laden with charcoal and during the rainy season floated down to Cutwa on the Bhagiratti; the charcoal is highly remunerative but the boats merely sell for their prime cost. The presence of steamers on the Ganges and Bhagiratti have much reduced the number of boats that were formerly built at this place. The wood used in building the boats is sal, which is brought from the plains and hills of Tuppeh Belpattá, a few miles to the north-west of the village, that grown on the hills being considered the hardest and most durable.

Immediately after the first heavy fall of rain in June, and after the dangerous bore called the Hurpa has passed down, immense rafts of small timber, fire-wood and bamboos are floated down the river towards the Bhágiratti.

The Hurpa above mentioned is a huge wave caused by a sudden fall of rain in the hills which rushes down the dry bed of the river with a tremendous roar, throwing up in front of itself a cloud of dry sand; natives and cattle are said to be drowned every year by this wave.

Sádipur is situated on the left bank of the More and opposite to the mouth of the Sidh Nalláh, in the bed of which nalláh and about six miles above its confluence with the More, a bed of coal and a hot spring are reported. I did not visit the spot. The village is immediately under a confused cluster of low and well wooded and bamboo clothed gneiss hills. The gneiss is of a very fine grain with salmon colored felspar which imparts to the rock a cheerful and lively color.

17*th January*, 1851.—Direction north; ten miles to Bunprassi. At the commencement of the march entered a dense jungle a mile in width under the Kúlang hills, which jungle lies in the beat of a small herd of wild elephants which frequent this part of the country, the herd is said to consist of one male, several females and their young ones. These animals create much alarm in the villages lying along their beat, many of which have been lately deserted on account of the total destruction of the rice fields and in some instances of the huts of the Sonthals, which being probably covered with leguminous or cucurbitaceus creepers have tempted the elephants to tear down and devour their tempting and verdant covering.

The whole march, which was across country, lays along the base of the Belpattá hills through an undulating country with numerous villages, much cultivation and no jungle; a large quantity of Mahúá (Bassia latifolia) trees occupy the stony and gravel ridges. The whole country is cut up by ravines, every where displaying vertically arranged gneiss which in spots is highly contorted; a broad dyke of greenstone about one hundred yards broad runs parallel to the hills for six miles or as far as Prasbuni.

A small range of sandstone hills named Rámgarh two or three miles to the east of Prasbuni appear well wooded and in spots cleared for cultivation by the hill-men residing on their summits. Towards the centre of the range a soft greasy white rock is quarried and exported to Calcutta, Moorshedabad and to other places, where it is used for white washing, writing on wooden boards by schoolboys, or for ornamenting pottery and toys.

18*th January*, 1851.—Direction north-west to Jhilmillee on the left bank of the Brahmaní river; ten miles. Passed through the same sort of country as yesterday, except that upon nearing Pudma the ground becomes much more broken up by ravines, greenstone dykes

and gneiss rocks; the mahúá trees still giving the landscape a park-like appearance. Passed through several Sonthal villages, in each of which were a profusion of poultry, pigs, buffaloes, cattle and pigeons; small patches of tobacco and large fields of mustard. Tall castor oil plants surrounded the log huts which are thatched with rice straw.

The Sonthal women, wherever they have an opportunity, pay great respect to the elephant; I have seen them place their young children on the footsteps of the animal whilst they themselves bowed down to the ground touching the earth with their foreheads. At a village I passed yesterday the women in a large body stopped a very fine and large male elephant that was carrying my tents, and insisted upon rendering him all due honor which they did with much noise and laughter, smearing his noble forehead with vermilion and oil.

From Kurma Tand there is a fine view of the Débrágpur range of carboniferous hills to the north and lying within the Damin-i-koh boundary.

From Kurma Tand the descent to the Brahmini River is very rapid being about a hundred feet in a couple of miles; large masses of a fine grained gneiss protrude from an iron bound soil.

Crossed the Brahmini River a small stream about one hundred and twenty feet broad, of which only twelve feet was occupied by water, the rest being sand. This river forms the southern boundary to the Damin-i-koh; on the left bank at the ghaut or ford of which stands a small log bungalow erected by Mr. Pontet who has charge of the Rájmahal Hills.

From Jhilmilli which is a fine Sonthal village, proceeded eastward for six miles to visit the Domanpur coal beds which are exposed in the bed of the Brahmini river. The following is a roughly estimated section of the bed on the northern or left bank of the river.

	Feet.	Inches.
Red Earth, ...	24	0
Stratum of concentric Iron ore, ...	1	0
Grey Clay which is licked by the cattle, ...	2	6
Soft gray sandstone, ...	1	0
Good Coal, ...	2	6
Purple, blue and waved shale with nests of Iron ore,	4	0

The jungle in the vicinity of the coal consists principally of termina-

lias, such as ásan, bahirá and iburra, all of which are burnt for charcoal by the iron smelters belonging to Belpattáh who live within sight of the coal, but who cannot be induced to use it, being afraid as they say of the "Boot" or demons of the forests.

19*th January*, 1851.—Direction north, four miles, to Kátikúnd. The tract of land passed over is partly cultivated, here and there cut up by ravines but is well populated being studded with Sonthal villages, besides small patches of Asun jungle.

This tract of land bordered by the Brahminee River to the south and west, and by the Irú Nalláh to the north and east, and containing twenty-five square miles is claimed by Sumar Sing, a stipendiary hill chief, residing at Gango, under the Singhi Math hill in Tuppeh Belpattá, he receives ten rupees from Government per mensem although residing outside the Damin Boundary.

It appears that all the Pergunnahs lying contiguous to the hills have lost land, by Government having included the hills within a boundary as pointed out by the Zemindars in 1832, at which period all the land lying immediately under the hills as well as a portion of the outer hills which in reality did belong to the Zemindars and not to the hill-men were covered with an almost impenetrable jungle, and little imagining that the land could or ever would be cleared were careless in defining their boundaries. The Damin-i-koh boundary after a great deal of trouble was settled, the Sonthals from the south were admitted; before whose axes the forest disappeared in a few years; the wild beasts that had been the terror of these hitherto unexplored wilds were soon destroyed by the arrows of the omnivorous Sonthal, the land was sown and being a virgin soil yielded large returns; the Zemindars seeing these facts before their eyes and seeing themselves fairly ousted from their own land, nevertheless by their own consent, for each Zemindar on the boundary signed an agreement as to the correctness of the 1832 boundary, are now beginning to repent of their hastiness in having signed away their land and are endeavouring to recover what can never be theirs again. That the land did belong to the Zemindars there is no doubt, as large masses of the hills are still known by the names of the neighbouring Pergunnahs, and Pergunnah Sultánábád lying on the East of the hills has acknowledged land, about five thousand acres, lying on the Western side of the hills; and the valley known as the

Pachwárá pass and now entirely occupied by Sonthals, in former days connected the parent Pergunnah with its now detached bantling.

Káticund is situated upon high ground a few hundred yards from the Iru Naddie; several Bengali grain-dealers live in the village, who buy mustard seed and rice from the Sonthals, but for a price far below its true value; the grain is exported to Sury.

Near Mr. Pontet's bungalow at Káticund are several heaps of carved stones the remains of an ancient temple; the stones have been brought from the neighbouring northern hills distant about three miles and are of a coarse red sandstone embedding masses of glossy quartz. The sculptures represent what I imagine to be the naked priests or Digambar of the Jains; the carvings are of the rudest workmanship and are very numerous. The carved stones are arranged so as to form two hollow squares of about twelve feet square, and a few feet apart, both of which are covered with thatched roofs and surmounted by Shiva's trident. The Bengalis have established a Brahman to take charge of these groups which together with several Lingams have been dedicated to Shiva and are well smeared with ghee and vermilion. The stones have been originally held together with metal clamps; as the mortises at their angles show, but no trace of the metal appears.

The stone kallas or series of circles for the summit of the temple are well carved, resembling huge cog-wheels, and are of the same style as those found amongst the rude and ancient ruins on the Mundar Hill in Bhaugalpur; on the Kowa Dhole of Behar and that are so plentifully distributed throughout all the hills of that zillah.

The remains of this temple is the only piece of antiquity in this neighbourhood, and the natives of these parts affirm that in former days this was a populous and well-cultivated country, that it then became overrun with jungle and was deserted, and that it was only beginning to be again populated, cleared and cultivated.

Of the truth or probability of such a change having taken place we have no reason to doubt, for every one who has travelled in India must have seen temples, caves and forts which must have cost much time, labor and expense in their construction, and which in their arrangement and high finish show an amount of intelligence and industry quite wonderful, now given up to the wild hill tribes, or buried in deep jungles.

20th January, 1851.—Direction north-west fourteen miles to Kendweh, on the western side of the hills, and at the entrance of the Pachwárá Pass or Valley. The country passed over to-day undulates considerably, and is much broken by ravines, a good road has been cut by Mr. Pontet mostly through a stiff brick red soil; crossed several streams all with rocky bottoms, each affording good sections of the country which is composed of gneiss of great beauty especially that in the Gumrá Naddi. Passed to the west of the Dhannia hill at the foot of which, near a village named Undhasol, is a collection of carved stones similar to those at Káticund and evidently from the same ruined temple. Two miles north-east of the Dhannia hill in the Gumrá Naddi are beds of coal discovered by Mr. Pontet in 1846; two miles north of the same hill and near the Nargunje Bungalow and in the same nalláh are other beds of coal also discovered by Mr. Pontet in 1840.

The view of the Mahuágarhi range of sandstone hills to the right of the road is particularly fine, the height above the sea of the trigonometrical point on the summit of the western peak is about 1,500 feet.

From Gowrapuhar village at the foot of Mahuágarhi and whence there is an extensive view of the plains of Bháugalpur of the Mundar and Noony hills, the descent to Kendweh is very sudden.

Three miles in an easterly direction from the Kendweh Bungalow, at the village of Burgo on the banks of the Banshie Naddi there is a bed of coal lying upon gneiss.

21st January, 1851.—Direction north twelve miles to Burwá. The road is over very broken and raviney ground; numerous running streams flowing from the hills and a good deal of jungle, the principal trees of which were asun, agye, dhamin and dhow; crossed the Banhie river which flows westward through the Pachwárá pass. The road travelled over to-day was cut by Mr. Pontet and passes through numerous Sonthal villages, around which were fine sheets of cultivation, comprising mustard, gram, cotton and junera, the latter cut and stacked. The views along this march are particularly pleasing, especially near the Bokraban Bungalow which stands on the banks of a small hill stream and buried in a dense jungle in which I observed some very fine sál and semul trees. The numerous pure and gushing

hill streams met with on this march have a most pleasing effect upon the Indian traveller, who is generally doomed to dry water courses and drier roads.

The village of Burwa, where I halted, is under a small gneiss hillock; which together with its small patches of cultivation are buried in a pretty forest.

Observing a tuft of straw tied to a tree in the jungle I enquired of the manji the meaning or use of it, he informed me that whenever a Sonthal is desirous of protecting a patch of jungle from the axes of the villagers, or a patch of grass from being grazed over, or a newly sown field from being trespassed upon, he erects a bamboo in his patch of grass or field, to which is affixed a tuft of straw, or in the case of jungle some prominent and lofty tree has the same prohibitory mark attached, which mark is well understood and strictly observed by all parties interested.

On my arrival at the village, the whole female population came out with their families to see the elephants and white faces. Amongst the party of lookers-on was a very pretty young Sonthal girl, she did not belong to this place but had just arrived on a visit from her own village, and as she recognised many of her old friends she saluted them in the following manner; running up to her newly discovered friend she threw herself down on her knees and laid her head upon the feet of the saluted; who in return stooped down and spreading her two hands over the kneeling girl carried them with the tips of her fingers turned in towards the palm of the hand to her own head, where she held them until the pretty visitor rose from her kneeling position, when they immediately commenced talking, examining each other's bracelets, hair-combs and other ornaments. This graceful salutation was repeated to each female acquaintance in rapid succession. Upon my attempting to sketch a few faces the whole party decamped; the knowledge of the dislike of the Sonthal to have his face drawn I subsequently turned to a good account, as I was always able at any given moment to disperse a crowd that had become troublesome by merely producing a sketch book and pencil; the hill men and women on the contrary will upon being asked throw off their clothes, sit or stand in any posture to have their likenesses taken.

In the afternoon I entered a thick forest of assan and chironji at

the base of the Tatukpara hill, half an hour's sharp climbing by a steep footpath brought me to the summit of the hill; the hill village of Tatukpara which the year before had stood on the summit of the hill had consequent upon the death of a villager, been removed half way down into the valley. From the old site there is a capital view to the eastward of a fine cultivated valley which has been occupied and cleared by Sonthals; this valley is backed by a range of hills studded in every direction with hill villages, the sides and tops of the hills cleared and occupied by large sheets of cultivation cleared by the indefatigable hill-men, and cleared in spots where it is barely possible to walk as I had good proof in returning to my tents down by another road. From Tatukpara I counted thirty hill villages perched either on the summits or on the slopes of the hills, whilst the villages of the bashful and quiet Sonthals were seen far down in the secluded valleys; on this hill there is a fine collection of trees of a very large growth, the principal of which are mango, fan-leaf palm, tamarind, kurm, pipal, al or moringa, ásan and cheronji; of crops there were the remains of tobacco, Indian corn, junera, bora bean and kahar dall; the level ground had been ploughed.

The road up the hill was over compact basalt and masses of iron stone overlying gneiss; a mile to the north the descent from the hill was over sandstone overlying basalt, the sandstone appearing as a small precipice in the middle of a field or cleared space on the hill side, the rock is of a pale color nearly white and of a very fine texture. The basalt which forms a great portion of the southern and central hills appears to have intruded in upon and to have much disturbed the sandstone and coal beds. The field above alluded to was one of the numerous cleared hill sides on which the hill-men produce as good crops as their low-land neighbours, it was so very steep that no one of the party could descend without holding on by the stumps of trees or by the long kirbee stalks, grass or rocks, any loose stone removed from its place rolled to the bottom of the hill.

From the forest at the foot of the hill large quantities of the peear or peeal, the delicious little fruit of the Chironjee sapida, are collected by the Sonthals and sold to the buniáhs of the plains. This fruit which is dried as a raisin and considered by the rich natives as a great delicacy, sells for eight annas the seer in the Behar and Bhaugalpur

districts; but the buniáhs only give the Sonthal weight for weight in rice for this expensive luxury. A seer of peear is worth eight annas, a seer of rice is worth one pice, so that only one thirty-second portion of its true value is given to the Sonthal.

22nd January, 1851.—Direction north. Passed a bungalow at Chundná at the second mile, and from thence struck in under the hills through a series of wild jungly ravines, and amongst gneiss hillocks and over greenstone dykes to Súndari Kulan, a fine large Sonthal village situate close under the hills, and surrounded by sheets of mustard cultivation. The village is about one mile in length, being one long street one house deep, with about one hundred family enclosures, each enclosure occupying from four to five log-wood houses. These enclosures are made with the green boughs of the Sakua; planted in the ground and tied together they keep each family distinct from its neighbours; they generally contain a Sonthal and his wife; several married children and their families; a pig stye, buffalo shed and a dovecot; a wooden stand holds the water-pots, the water from which is used for drinking or cooking, there is also a rude wooden press for expressing oil from the mustard seed. In a corner of the yard there will probably be a plough, or a couple of solid wheeled carts, whilst numbers of pigs and poultry are seen in every direction. Each of these enclosures contained on an average ten souls thus giving a population of one thousand to Súndari.

The street is planted on each side with the pungent sohajná, which tree is a great favorite with the Sonthal.

The numerous pig-styes and great abundance of poultry in the village, proclaim the absence of caste amongst this free and unshackled and un-priest-ridden tribe.

Close to my tent I witnessed a sample of their religion, as connected with their harvest rejoicings; it was a wild and extraordinary proceeding, and was as follows. Two men with dishevelled hair and with their heads hanging down as if in the attitude of deep thought, sat under a small shed a few hundred yards from the village; a drummer was beating furiously upon a Sonthal kettle-drum, who gave an extra thump on his instrument as occasional offerings of grain in small leaf bowls were presented by various Sonthals from the village, to a small stone erected in front of the shed; when the number of

offerings had reached to about fifty, the two men under the shed, whom I now perceived were shaking as if possessed with a violent ague, commenced shrieking in a horrid manner; several Sonthals immediately rushed forward and commenced asking the shaking men numerous questions, which were sometimes answered by words, but oftener by loud screams; a favorable crisis appeared to have arrived at last as both the men springing up from the ground with the most demoniacal yells and fearful bodily contortions, led out a small black male kid, whose head at one stroke of a sword, one of the mad or possessed men severed from its body; before the body could fall to the ground the second screamer who held the string that was tied round the kid's neck, rushed forward and caught it in his arms; lifting it off the ground with his left hand, he grasped the neck with the right hand so as to check the flow of blood from the severed arteries; he then walked up to the small leaf dishes containing the offerings, withdrew his right hand, and from the spouting arteries filled as many of the cups as the flow of blood would permit; the body and limbs of the kid writhing and kicking convulsively a great portion of the time.

Having finished this disgusting scene a question was again put by the Mangi of the village to the sacrificer, as to whether the deity was pleased, and whether he was ready for the dance; the answer was in the affirmative; upon which, one of the possessed men had a green bamboo placed in his two hands which were raised high in the air over his head, and the word being given by the Mangi to go and call out the villagers to drink and dance in honor of their deity, the man tore away at a furious pace, his hands over his head, screaming in a most horrid manner. The villagers received the summons and repaired male and female to join in the dance which took place at the place of sacrifice.

I subsequently ascertained that the shaking fits betokened excessive thought or contemplation, and that men fast for two, three and even for ten days to bring themselves into a state of half wildness, during which period they are supposed to answer any questions put to them, not through their own power or by their own knowledge, but through the power of the deity possessing them, which in this case appears to have been the spirit of Bora Mangi a deceased and canonized Mangi and formerly a chief amongst them.

Towards evening I revisited the dance and found the whole party very drunk; I was asked for money for more drink, which I threw to them from my elephant.

In the evening I crossed the Gúmáni nalláh, a deep hill stream, which has cut its bed through contorted gneiss, and ascended the basaltic hill on which is situate the hill village Jolá; the view to the north and east is very beautiful, every hill appearing capped by a village surrounded by fine mango and fan-leaf palm trees; much jungle has been cleared away from all the hill sides for the cultivation of junera and Indian corn.

In the village of Jolá I had much difficulty in making any of the women, who seldom understand or speak Hindustáni, comprehend what we wanted; the men were all out, either hunting, cutting timber, fishing or attending the markets; after having examined the interior of several houses, a young man at last appeared to whom were presented a few trifles such as German snuff boxes, needles, thread, buttons, beads, bodkins, and lastly a dram of brandy; this last gift opened his heart and set loose his tongue; presents were then distributed to the women who now flocked in numbers to the spot where I stood, the presents consisting of bead necklaces, needles and sewing cotton for the women and bright metal buttons of all kinds of gaudy patterns for the children. The young man at my request showed me the interior of his house, and introduced me to his wife, who was busy cooking in the centre of the one room, which constitutes the entire house; the hill houses in general are very neat, being composed of either matting, hurdle, or thin sticks, sometimes smeared with mud to keep out the wind, the whole supported by stout timbers upon which rests a lofty hogbacked roof with very low eaves; the doors are in the gables and are protected by verandahs; the roofs are pitched at a singularly obtuse angle giving great width to the house. The rafters of the present house were covered with heads of Indian corn, junera, and beans; against one of the mat walls hung a pair of small antlers with four tynes each, serving as brackets for holding bows and arrows, and a few other light articles. A large drum hung in one corner, a fire was burning in the centre of the room, the smoke from which had blackened every rafter, beam, and bamboo in the house, across the hut was slung a grass hammock, in which the hill people

sleep during the rainy and hot seasons; the hammock was twelve feet in length, six feet in width when opened, and was netted; each mesh being a foot in length. I examined the fabric and found it to consist of the fibre of the Bauhinea scandens—a small fishing net and creel hung in another corner, for the hill-men descend the hills and fish in the small torrents but they never capture any thing larger than a moderate-sized minnow.

One old woman I observed was afflicted with an enormous goitre.

23rd January, 1851.—Direction north-east eight miles to Dhumaturi where there is a bungalow.

Upon leaving Súndari, entered a thick jungle of ásan, and crossed the Gúmáni or Jamuni by a difficult and steep ghaut; the elephants were obliged to break their way through the jungle there being no road; skirted some low gneiss hills through a small village named Manikbaithan to the banks of the Gúmáni, which nalláh we had to cross again; but finding no possibility of getting out of the bed of the nalláh after having with great difficulty got down into it, I travelled down the stream for a short distance, and on the left bank discovered a bed of slaty coal with its associated shales and sand stones; one mile further north of this spot and under the Chuperbhita hill, I found three more beds of coal, both on the right and left banks of the nalláh—one bed is a few hundred yards from a spirit shop on Mr. Pontet's new road leading into the hills through the Dhumaturi or Chuperbhita pass, and where the Domra nalláh falls into the Gúmáni. The best burning coal was that first found; that found immediately to the west of a small Sonthal village named Morjor is also good.

The existence of this coal has hitherto been unknown, and as the beds are situated in the Chuperbhita pass, and under the hill of the same name, I propose to call them the Chuperbhita coal fields. There is little doubt that this coal is but a continuation of the Burgo, Dubrájpur and Harráh coal beds which produce a slaty inferior mineral.

A heap of the coal and shale, the latter highly bituminous, weighing about thirty pounds burnt with a cheerful flame for three hours in the open air; the coal resolved itself into a fine white ash, the shale of course remained unchanged in shape.

All the beds dip to the north-east at a considerable angle, but at one of the beds I noticed the shale and sandstone so disturbed that the strata formed a saddle; the anticlinal line running east and west; the disturbing agent does not appear, but is very probably the neighbouring basalt.

The following section was observed at this spot on the bank of the stream—Red earth,..... ..... 12 feet.

Black bituminous shale alternating with a coarse white sandstone embedding masses of waterworn quartz, ... 12 do.

Direction of strata east and west.

The village of Dhamini is surrounded on three sides by flat-topped hills, which are thickly covered with hill villages. To the east is the commencement of the great central valley whose bounding hills to the east are seen five miles distant.

Some very fine saul trees have been preserved by Mr. Pontet near the bungalow, whose grand proportions give an idea of what the forest must have been before the advent of the Sonthals.

In the forest at the foot of the Chuperbhita hill, I saw some very fine and large specimens of the Mimosa siris.

During the march, passed over several extensive kunkur (nodular limestone) beds lying upon the almost naked gneiss rocks.

24th January, 1851.—Direction north-east to Burhyte; at starting entered a small patch of asun jungle, at the second mile crossed a small hill torrent in the bed of which a small fragment of a basaltic column was found. The road the whole march was over compact basalt, occasionally decomposing into spherical masses each with a hard ferruginous nucleus. The soil at the fourth mile, becomes darker and at Burhyte it is the regur or cotton soil of the Dekkan. Passed through several fine Sonthal villages, namely, Kusmáh on the banks of the Gúmáni which stands at the ford; Kadmáh, Gopládih, Hindöádih and Sonájori.

Burhyte the capital town of the hills, is a substantial Sonthal village with a large population, and about fifty families of Bengali traders; there is a good bazar, and two markets are held during the week. There is also a tank and Mr. Pontet has planted a plot of ground with potatoes.

Burhyte is situated in the centre of the great valley which extends

twenty-four miles north and south, with an average width of five miles, and is surrounded on every side by hills, through which there are several narrow passes leading into the plains; one pass is to the south-west, the Chuperbhita pass; the second is the Mujhwa or Murcha Ghat to the north-west, or that leading to Bhaugalpur; and one the Ghatiári pass, to the immediate east of Burhyte, leading to Rájmahal and Junipur through Kankjole; and a fourth pass to the south-east or the Murgo Ghat, leading through Umbar to Junipur; and a fifth, to the north-east, leading over the hills to Rájmahal; besides these five regular passes through all of which Mr. Pontet has cut good carriage roads there are numerous footpaths leading over and along the hills.

From Burhyte, large quantities of rice, bora beans (Dolichos catjang), Indian corn, mustard and several oil seeds are conveyed away in carts by Bengalis to Jangipur, on the Bhágiratti; and in return for these grains, the Sonthals are paid in money, salt, tobacco, beads, or cloth. The soil around Burhyte is the deep black cotton soil, producing luxuriant crops of rice, Indian corn, junera, beans, koorthee, tobacco, gram and mustard.

The united waters of the Gúmáni flowing from the south, the Morel or Morang flowing from the northern portion of the valley, as far as to the very neighbourhood of the Motijharná hill, overhanging the Ganges at Sikrigalli; meet at Burhyte and with a sudden turn to the east leave the hills by the Ghatiári pass, under the name of the Gúmáni Nalláh: which flowing through Kankjole falls into the Ganges near Farru ká thánáh.

The beds of the streams flowing through the valley are of great depth, perhaps thirty feet, but are nevertheless liable to be filled to overflowing, as was the case in 1845; when the Morel overflowed its banks, swamped the whole of the northern portion of the valley, drowning about five hundred head of cattle and forty Sonthals. These floods only occur when very heavy rain falls in the northern hills, and are periodical, happening about once in five years.

This valley viewed from any of the surrounding hills, affords an admirable example of what can be done with natives, when their natural industry and perseverance are guarded and encouraged by kindness. When Mr. Pontet took charge of the hills in 1835, this valley

was a wilderness, inhabited here and there by hill-men, the remainder was overrun with heavy forest, in which wild elephants and tigers were numerous; but now in 1851 several hundred substantial Sonthal villages with an abundance of cattle, and surrounded by luxuriant crops, occupy the hitherto neglected spot, the hill-men have with a few exceptions retired to the hills, being either unwilling to be near the Sonthal, whom the hill-man despises, or courting that privacy they could not enjoy in a cultivated plain, have yielded up the fertile plain to their more industrious and energetic neighbours.

The smaller valleys leading out of the main or large valley still afford abundant pasturage to large droves of buffaloes, that are driven in from the plains of Bhaugalpur; the Zemindárs paying the Sonthals five rupees per hundred head of cattle, for the right of depasturing the jungle from the month of December to April.

I met Mr. Pontet this day at Burkyte and in his company attended the Friday market, that was established by him a few years ago. The amount of grain, the produce of the valley, exposed for sale was very great; numerous carts from Jangipur on the Bhágiratti were in attendance to convey it away towards Murshedábád, and eventually to Calcutta from whence much of the mustard that is grown in these hills is exported to England.

Besides grain of various kinds, there was a fair display of sugarcane, salt, lac, dammer or rosin, brass pots and bangles, beads, tobacco, sugar, vegetables, chillies, tamarinds and spices; potatoes, onions, ginger, cotton, thread and cloth, the latter in great abundance.

Two miles north of the village and extending for a mile east and west and immediately under a range of basaltic hills, is a bed of chalcedony, agate balls, cornelian and quartz crystals. The agate and chalcedony affect the hollow globular form, which globes, upon being broken open, display the quartz crystals pointing inwards, some of the crystals are of great beauty, resembling amethysts, being of a bright violet color probably owing to the presence of one of the oxides of manganese. The crystals vary in size from those of a microscopic fineness to several inches in length, and of a corresponding thickness.

The Sonthals have ploughed in amongst this curious collection of natural gems, any one of which would be an ornament to a geologist's cabinet, many of the globes have been fractured, displaying in the sunshine a brilliant assemblage of sparkling crystals.

The agate balls are of all sizes, some only a few ounces in weight, whilst others weigh several hundred pounds.

At the village of Khurwa and underlying this bed of agates is a bed of wacke enclosing small balls of chalcedony and stilbite; the wacke passes into a very beautiful clinkstone, of a homogenous texture of a pale salmon or dove colour, rings under the hammer, is easily broken, and fracture highly conchoidal; it is found in large slabs six and eight feet in length, also in small parallelograms and wedge-like splinters. If this stone could be found in any quantity it would be a highly valuable discovery, as from its natural fracture or stratification, the stone would be highly prized for many domestic purposes.

A quantity of this stone was taken a few years ago to Bháugálpur for the purpose of ornamenting a tank, but at a fearful sacrifice of bullock life; many of which animals belonging to the Sonthals perished from being overloaded; the Sonthals have a bitter recollection of the transaction, as they say they were never remunerated for the loss of their cattle.

25th January, 1851.—Went on an elephant with Mr. Pontet five miles in a North Easterly direction, to see a cave which lies in a small valley. Crossed the Gumáni Nullah, flowing to the East over a cultivated country to the entrance of the valley; the scenery about this spot is particularly pleasing, the hills have sufficient height to display the forests growing on their sides and summits to advantage, and the plain is beautifully wooded with large trees, that have escaped being felled by the Sonthals when clearing the forest.

In one of these trees I saw a pair of very large wood-pigeons called by the natives Begum Hurryel; they are unknown in the plains outside the hills.

After a short scramble through jungle and over broken basalt and agate, we arrived at a black wall-like precipice about fifty feet in height, composed of basaltic columns over which a feeble trickle of water spread itself, imparting to the rocks a pitchy hue. High up the rocks two pakur fig trees have taken root, and thrown down from their position, long and elegant rope like roots forty feet in length, whose silvery whiteness contrasts well with the black columns. On the summit of the precipice are some very fine naked armed sterculias, and at the base of the precipice is a cave named Seer Gádi forty feet in length.

twenty in depth, and about five feet six inches in height; the roof of which is composed of the basis of the columns. The cave is dedicated to Mahadewa whose emblem the Lingum, is seen in the cave. The Lingums of which there are a great number, the walls and roof, are besmeared with red lead and ghee; the floors and walls in the vicinity of the Lingums are in a wretched state of filth, from the quantity of goat's blood, which has been sprinked about in every direction; the blood being that of victims offered up by Sonthals, hill-men, and Hindus indiscriminately. The cave is kept by a Bráhman from Chitowlia in the plains, and clears about one hundred Rupees yearly, the produce of votive offerings, principally presented by the Hindus from the plains.

A small well has been sunk in a mountain torrent close by, for the reception of drinking water.

Immediately at the foot of the precipice stood the half of a handsome agate ball, a foot in diameter, filled with pure water, which falling drop by drop from the columns, afforded the attendant Bráhman a cool and, as he imagined, a holy beverage.

The basaltic columns are very irregularly crystallized, exceedingly tough and are marked or are indented with numerous and minute broken vescicles.

From the cave we mounted the hill and after a walk of four miles in a southerly direction along the summit, through a very pretty forest and fearful spear grass, we descended at the southern spur over an extensive land-slip that occurred during the great flood of 1845; the Sonthals and hill-men who were with us say, that it descended during the night attended with great noise. The forest is completely rooted up for several hundred yards along the face of the hill, displaying large mounds of red gravel, clay and masses of basalt.

Thermometer 43° Faht. at sunrise.

26th January, 1851.—Thermometer at sunrise 46° Faht. Early this morning Mr. Pontet kindly drove me in his Buggy to Ghutiari, which lies six miles south-east from Burhyte, and is on the eastern side of the hills; to clear which we passed through the Ghutiari Ghaut, which is a good carriage road running between very prettily wooded basaltic hills capped with hill villages. The whole of the drive was through a well cultivated and populated country, and prettily

wooded. A Sonthal although he does clear away the forest in a most masterly style, has the good taste to spare all the useful and ornamental trees when of any decent size, this always imparts a park-like appearance to the Sonthal clearances.

At the village of Khulouna, the Sonthals have dammed up a sluggish stream whose bed has thus become a very deep body of water, abounding in fish, which has attracted numerous fishing eagles, which we saw busy at their avocation. At this same village, Mr. Pontet has planted a large field of potatoes, in the hopes of inducing the Sonthals to take a fancy to the vegetable, and pay some attention to its cultivation, but no persuasion hitherto used, has been forcible enough to induce the Sonthal to give themselves the trouble to raise this crop, which would meet with ready purchasers in the Bengális; they say "We do not want the potatoe."

At this spot is a small Shola swamp (aschynomene paludosa) but no one makes any use of this useful water plant; lower Bengal, I imagine, supplying all the wants of the surrounding country.

The Bungalow at Ghutiari is only five miles from the eastern boundary of the hilly tract.

Buffaloes from their superior strength, are preferred by the Sonthals both for agricultural purposes as well as for draught, to the common grey cattle, which latter animals are readily exchanged with the Hindus from the plains, who import buffaloes for that purpose, all the solid wheeled carts if possible are drawn by buffaloes.

The Sonthal in the construction of his solid wheeled cart, and in the mode of loading it, shows an utter contempt or ignorance of all rules of mechanics; the cart consists of two wheels, composed of two or three pieces of wood, each put together so as to form a solid wheel three feet in diameter; these wheels are supported at a distance of four feet apart by a wooden axle, on to which and three feet apart are pegged two long saplings or bamboos fifteen feet in length; these bamboos forming the whole body of the cart are at the other extremity tied together, and attached to the yoke that rests on the buffaloes' necks. The wheels being at one extremity of the poles, and the other end reposing on the buffaloes' necks as a fulcrum, leaves fifteen feet of unsupported length as the body of the cart, on which are imposed heavy burdens of rice, packed in huge and ingeniously made straw

baskets or rather straw rope balls, five feet in diameter, and as the driver almost invariably adds his own weight by standing on the cart, a ruinous and cruel weight is thus thrown upon the necks of the draught animals and upon the body of the cart, which bends and springs under the weight, whilst the wheels which are at the utter extreme of the bamboos are pressed outwards and backwards and seem inclined to fly from their position, which they would do with great force if relieved by their retaining wooden pegs.

When it is intended to convey grass, rice in the ear, or any other crop on these carts, a few sticks are interwoven with the two skeleton longitudinal bamboos, so as to form a temporary retaining body to the cart.

No iron or other metal is ever used in the construction of these carts; wooden pegs and twisted grass string serving all the purposes to which metal is put by a wheelwright.

The plough in like manner is a simple but effectual instrument, consisting of a crooked block of wood, fitted with a still more crooked wooden handle, and a light beam from six to nine feet in length; the share is a small bar of soft iron a foot in length and one inch in width, one end of which is hammered into a wedge-like shape, this is the cutting part, the other or blunt end, is shipped into a groove in the foot of the plough, where with the aid of two small iron clamps laid across the grove to prevent it flying upwards, it is retained by the pressure conveyed to it during its passage through the soil. The deepest furrow ploughed with these instruments is about four inches.

Two buffaloes draw the plough and one man guides it, after the day's work the Sonthal shoulders his plough and walks home.

27th January, 1851.—Thermometer 46° at sunrise.

General direction north west, twelve miles. The distance gained this march was only twelve miles, though twenty miles of ground was gone over.

At Burhyte, crosses the Gumáni river, exposing basalt in its bed; to Kuksi two miles in a northerly direction, over a well cultivated country.

From thence west, over a spur of the low basaltic hills, offshoots from the high Sunjori hills to Telaki, situate in a valley or cul de sac formed by the Sunjori and Mori range of hills. Near the village of Telakee, are two trees situate in a jungle on the banks of a nullah; the

name of the tree I am unacquainted with; one which was of great beauty had a tall straight stem sixty or seventy feet in height, surmounted by an umbrella-shaped arrangement of branches, which projected from the main stem at right angles, half way up the main stem was a similar arrangement of branches; from all the smaller branches and twigs an infinite number of their delicate green pods a foot in length, but not thicker than a quill, hung in festoons, forming an elegant fringe to the lower outline of the foliage. All parts of the tree yield large quantities of a thin white milk, which falls in large drops in quick succession when any pod, leaf or twig is broken. The leaves grow round the branches in circlets of eight leaves, from amongst which spring four delicate stems which in their turn are again surmounted by eight leaves; the leaves are three or four inches in length, narrow and pointed, smooth and very milky; the native or Sonthal name for the tree is Chutmi, and the milk is used in hydrocele;—none of my up-country servants recognized the tree. I have, since writing the above seen two stunted specimens of the same tree growing near Sooree; they were also called Chutmi by the villagers.

From Telakee ascended the Mori hill, supposed to be the highest hill in the whole of the Rajmahal range. The range at the base is very densely wooded, the soil covered with kunkur. After an ascent of two hours reached Busko, situate in a fine forest of large trees principally asun, kurm, mango, tamarind and dhow, above which is situate the village of Mori.

In a small torrent I saw basaltic columns measuring fifteen feet in circumference being hexagons of two feet six inches each face.

Mori is a large and well populated hill village; several lowlanders were bargaining and bartering with the hill-men, for grain grown on the summit of this range.

The summit of Mori which is about two thousand feet above the sea, is covered with a fine forest principally of kurm, (Nauclea) some of which have attained an enormous size, one in particular is well known all over the country, and has been of great use to me during the progress of the survey of the hills as it stands, a prominent landmark visible from most parts of the northern hills. From this tree there is an extensive view of the greater part of the hills as well as a great portion of the plains of Bhágalpur.

At the village of Mori, Mesur, Mangi, or chief of the village at my request took me inside his neat house, in one corner of which stood a small bamboo platform, on which were placed several skulls of the barking deer, and two skulls of the four-horned antelope, which had been killed on this hill either by himself or by his ancestors; the skulls must have been of a great age, as they were nearly black with smoke. It is customary to hand these trophies down from father to son, and such is the reverence with which they are regarded that they are worshipped and bowed down to as gods.

I made a present to the Mangi of some money who in return insisted upon loading my servants with bora beans; here as at all the hill villages I was received with the greatest attention, the mangis invariably placing their neat little bedsteads in the shade as a seat not only for myself but for all my attendants.

Two fine young men accompanied me down the hills as guides; we descended the western flank of the Mori peak to Chupri, situate on a lower range of hills; passing through the village I saw a platform perched up in a tree covered with skulls, the only one I could recognize was that of a neelghye; I did not like to disturb the group hidden as it was by leaves, knowing the importance and respect they pay to these strange relics.

The steep descent from Mori to the lower range which was over loose and rolling pieces of basalt was a work of some difficulty to a small female elephant which had accompanied me up the hill, to the utter amazement of the hill-men and women who had never seen such an animal. A long walk of seven miles along the saddle back of a range of hills, during which passed through Sutbhera, Dumlee, and Seni, all hill villages and through a deliciously cool and shady forest, I descended the Semi Ghaut at 3 P. M. to the Sonthal village Semi, having been on foot ever since 6 in the morning, and that without food.

The whole route was over compact basalt with occasional masses of iron ore agate, chalcedony and quartz crystals. The only animals seen were large troops of the Sungoor monkey.

I was particularly struck with the enormous size of the Arahurdol (cytisus cajan) that grew upon the hills, each seed being the size of a small bean.

On descending the Semi Ghaut I saw black shale in a small ravine.

28th January, 1851.—Direction west five miles to Hurrah, situate on a bed of coal and surrounded on three sides by hills. The road is through jungle and over very raviney ground; as far as Bumkungaon two miles from the Ghaut, the formation is basalt, decaying into the usual spherical masses, and large quantities of iron ore. In a small nullah a little to the south of the village are basaltic columns; at Lohartumba or four miles from the Ghaut is another group of basaltic columns, and immediately to the west, a coarse ferruginous sandstone appears; and at Hurra large beds of coal appear in a small nullah close to the village. This coal I believe was discovered by Captain Tanner in 1831; in 1850, a shaft was sunk through the beds but a rush of water taking place, the work was abandoned. The coal is of a slaty and inferior kind.

In the evening, walked to the hill village Hurra, where I had an opportunity of inspecting three collections of skulls and bones; two heaps were on the grass roofs of huts, the third, or the mangi's group was on a small wooden stand supported by wooden posts, and contained numerous skulls of the spotted deer, wild hog, porcupine, hare and barking deer.

On the point of one of the spotted deer horns a hen's egg was empaled.

Some of the pigs at this village were of an enormous size, and of a different breed from the ugly long legged pig of the plains.

29th January, 1851.—Direction north two miles through ravines of sandstone debris, with indications of coal; passed through a gap in the Gundesree sandstone range of hills named Bora Ghaut, where there are again indications of coal, descended the Ghaut, and skirted the base of the hill to the western extremity, which terminates in several peaks of sandstone and iron stone curiously jumbled together; which gave Dr. Buchanan the idea of the spot having been a volcano. The rocks are a heavy ferruginous red sandstone. Iron is smelted at several villages in the neighbourhood. Turned to the north-east and skirted the base of a detached sandstone hill; the northern face of the hill is singularly barren, presenting masses of glaring white sandstone. At Sohunneea, where there is a bungalow, I attended the market at which were several hundred hill-men and women. It is really surprising to

see the torture, for it can fall little short of such an infliction, the Sonthal women put themselves to, in order to, as they imagine, adorn their bodies. Their arms, ancles and throats are each laden with heavy brass or bell metal ornaments. I had a quantity of these ornaments weighed, and found that the bracelets fluctuated from two to four pounds; the anklets four pounds each; and as a fully equipped belle carries two anklets, and perhaps twelve bracelets, and a necklace weighing a pound, the total weight of ornaments carried on her person amounts to *thirty-four pounds of bell metal;* a greater weight than one of our drawing-room belles could well lift. Almost every woman in comfortable circumstances carries twelve pounds weight of brass ornaments upon her person.

The hill-women are much more moderate as far as the heavy metal ornaments are concerned, which would never agree with the frequent trips up and down their steep hills, but as many as twenty strings of bright coloured beads which cover the whole of the throat and breast of the wearer may be seen worn by a market-going woman.

Direction east, five and half miles, over a highly cultivated plain of black cotton soil; passed between two hills composed of sandstone, basalt and iron stone to Meghee, where there is a bungalow. The view of the hills from the bungalow is particularly beautiful, every peak or rise in the hills has a village upon it, surrounded by mango and palm trees; the hill sides are cleared of jungle for several miles for the reception of the rain crops. Meghee is situate immediately in front of the Munjwa pass, through which pass, it is supposed, the Muhammedans invaded Bengal.

Mr. Pontet has planted a garden at Meghee in which are flourishing coffee trees, lemon, casuarima, pine-apples, peas, cauliflowers, beet, mint, carrots and plantains.

30*th January*, 1851.—Direction north, twelve miles, over a fine cultivated country entirely occupied and tilled by Sonthals, passed through Murroro where there is a bungalow, to one of the boundary pillars, where I pitched my tent.

In the evening, went three and half miles along the boundary in a northerly direction, over a newly cleared country, which three years ago was a dangerous jungle on account of tigers. The zemindars of Munheearee a neighbouring and contiguous Tuppeh to the Damin,

alarmed at the Sonthals advent and wholesale clearance of the jungle, had disputed the boundary which I have settled by cutting a road through the jungle from pillar to pillar a distance of three and a half miles. The crops of Arahur dal and gram growing in the virgin soil are most luxuriant.

From the small basaltic hill Baltok, there is a fine view of the river Ganges, the Colgong granite hills, Peer Pointee and the country to the north of the Ganges.

A few years ago, the jungle at the foot of Baltok, was the resort of wild elephants which have been exterminated by the hill-men. Their mode of destroying these animals was by placing in their track Indian corn that had been poisoned with the Dakrah root; the Collector of Bhaugulpoor rewarding their success with fifty rupees for each elephant poisoned. The last elephant destroyed in these parts is supposed to have perished about twenty years ago.

31*st January*, 1850.—During the operation of directing the cutting of the jungle along the boundary, I was amused to see a Sonthal pounce upon a large nest of the mata or large biting red ants, that had been brought to the ground by the felling of a large tree, he beat the leafy nest violently in his hands until he had killed the whole hive, and then cooly commenced eating them, offering a pinch to his friends standing by. He said in reply to my question that they were acid, but very good; to the former opinion I agree, as upon tasting them I found the taste nearly as sharp as dilute sulphuric acid, having the same unpleasant effect upon the teeth, but to the latter part of the sentence I entirely disagree.

These ants, the dread of travellers in the jungles on account of their pugnaciousness and painful bite, build their nests amongst the leaves of the mango trees, which they agglutinate with a species of web into round hollow balls; the ants are of a pale orange color, half an inch in length with black eyes and are exceedingly numerous, carnivorous and troublesome.

In a house where I once resided on the banks of the Ganges, I was much troubled with an extensive nest of hornets that had taken up their abode in the thatch immediately over the entrance door: I was recommended by the natives to try the effects of the mata; a nest was accordingly brought and put into the thatch near the nest; as each

hornet arrived and settled, he was immediately seized by the ants, several to each leg, others mounted on his back and in a few seconds and after a violent struggling he fell dead to the ground; but whether stung or bitten to death I could not observe; in a couple of hours the ground was strewed with hundreds of hornets and before the evening the nest was destroyed.

I have seen a full grown chameleon killed in a few minutes by these ferocious insects; the poor creature had been, together with his cage, put in the sun at the foot of a tree, from which the ants descended, attacked the animal, and killed him.

1st February, 1851.—Direction north-east six miles to Simuria on the hills, the residence of Kesoo Sirdar, one of the northern stipendiary chiefs. The greater part of the road was through heavy jungle, through which a road had to be cut for the elephants. Passed over several beds of Kunkur lying upon basalt; and in a deep Nullah between two small Sonthal hamlets, Singtee and Simurtola, saw a bed of fresh water limestone common to the basaltic formation. This bed was discovered by Mr. Pontet last year and opened by him; it is a bluish grey rock, filled with minute longitudinal cavities; the strata are much contorted; it effervesces freely with dilute acid.

Ascended the Simuria hill to the village of the same name, by a steep stony road, through jungle; the rock is basalt with masses of iron stone.

The village of Simuria is buried in a fine forest of magnificent Nauclea and Uvaria, any one of which would be an ornament to a park; the soil on the hills composed of the decomposed basalt and iron stone mixed with decomposed vegetable matter forms a soil highly conducive to the growth of both trees and crops in general.

The view from the summit of these hills, which here form the northern boundary of the range is very extensive, extending to fifty miles north of the Ganges, and on clear days in the rainy and cold weather months, or from August to December, to the snowy range of the Himálaya, distant one hundred and eighty miles.

Kesoo Sirdar, who is an elderly man, was most attentive: he introduced me to his wives, (he has four,) to his children and grand-children, who all received presents according to their ages, consisting of money, beads, gilt and glass buttons, a large clasp knife, scissors, empty bot-

tles, gin, gunpowder, shot and soap, the latter article by especial desire of Kesoo.

The old chief took me to the summit of a hill close, by commanding an extensive view of the hills lying to the south. To the south-west the hill, Mundarin Bhaugulpoor, and to the west, the Monghyr hills are visible. On this hill a spot was pointed out, where some missionaries had felled a quantity of the finest trees for the purpose of erecting a house; the spot had, however, been deserted and the missionaries had never returned; old Kesoo mourned over his trees, remarking that although they had been felled in one day, they had taken fifty years to grow.

On a point of the hills immediately overhanging the Ganges, is a masonry platform where Mr. Cleveland used to pitch his tents. It is particularly pleasing to hear one of our countrymen spoken so well of by so large a body of half wild people as Mr. Cleveland is spoken of by the hill-men; his name after a period of sixty-seven years is still remembered with much affection.

2nd February, 1851.—Direction east along the top of the hills. In six hours travelled five miles, the road having to be cut the whole way through jungle. Passed through the hill villages Puchrookhee, Boothouna, Pokuria and encamped at Gogi, overhanging a deep dell and overlooking the Ganges; the road very difficult, being much cut up by deep water courses, jungle and loose stones. At Pokuria passed through a stone entrenchment which is here thrown across the road. In the days of the Muhammadan kings, the hill-men were in the habit of murdering all and every emissary sent from the Muhammadans, then in full force at Rájmahal; and this entrenchment which is a low wall of stones extending in a zigzag fashion across the road, was one of their favorite spots of ambush, where the hill archers lay in wait for the messengers or soldiers who were sent into the hills to coerce or otherwise annoy the hill-people. Kesoo Sirdar, who was with me remarked "*We were bad subjects in those days, sir, but Mr. Chibilly (Cleveland) soon put us on friendly terms with all our neighbours.*"

Close to this spot I stopped to examine one of the large creepers so common in these forests; it was a Ghila or Bauhinia scandens, its stem on leaving the ground, divided into three separate branches, of about six feet girth each which with their tendrils extended for several

hundred feet in every direction, occupying upwards of *one hundred trees and saplings* as their supports; the main arms extended for about five hundred feet in length and, at two and three hundred feet from the root, were three feet in girth, the edges of the stem scolloped and waved in a remarkable manner.

The forests on the northern hills are very fine, and contain much fine timber; the principal trees are Cassia fistula and a tree much resembling it, bearing the same long pod, but the tree yields a thick white milk when bruised; the Grislea or Dhow; the Bijeesaul or Dalbergia also called Sitsaul, Puhsar, and Sissoo, the name depending upon the part of the timber mentioned, the color of the wood, and age of the tree; Dhow or Grislea; Asun and Urjoon, both Terminalias, and Sakua, which I take to be a Shorea. The Saul forests in the northern hill are fast disappearing. The principal crops are Indian corn, Junera, Rajrahur dal, several small pulse and the Bora bean. The summits of all the northern hills are capped with laterite, which has abundant nests of bright red and yellow lithomarge disseminated.

In the jungles were traces of leopards and bears.

3rd February, 1851.—Direction south, six miles to Banghi. Immediately to the south of Gogi, descended by a very steep path over laterite to a lower spur of hills running at right angles to the high range fronting the Ganges; just before descending this abrupt height, a beautiful view of the great interior valley presented itself. As the road had to be cut through the forest the whole way, only six miles in four hours were accomplished. The forest on the southern slopes of the northern hills is exceedingly dense, as indeed, are the forests on all the northern hills. The forests traversed this march met completely overhead, affording a delicious shade even at noon. The woods resounded on all sides with the cries of jungle fowl and peacocks. Boa constrictors, mouse deer, leopards and various kinds of deer, are found in the secluded nooks of these hills.

The forests at the foot of the hills, are composed of the same kind of trees as noticed yesterday as growing on the summit, except that a few Saul trees appear; also a dense underwood of bamboo-grass, reeds, grass and numerous shrubs, amongst which the wild Jasmin spreads its branches laden with sweet smelling flowers. In the underwood, I noticed numerous small birds who appeared clothed with down rather

than feathers; they have a white bare rim round the eye, are very familiar or fearless, and very abundant. I have never seen the bird figured in any work of natural history. The golden oriole were also plentiful in the mango trees.

At Nowgachi hill village, which is one of the neatest and cleanest hill residences I have yet met with, are two very grotesque gods carved in a rude manner so as to represent elephants, to which animals they bear but a very faint resemblance. Between these images, which are surmounted by human heads, probably to represent the Máhut, or driver, at certain seasons of the year, goats, buffaloes, pigs and cocks are sacrificed to Bedo Gossain or the great god. A buffaloe was tied before the Mangi's door that was to be offered up during the present month.

Fifty young hill-men accompanied me from this village to assist in cutting a road for my elephants which they did with right good will and appeared highly pleased with the occupation. The hill-man is not to be compared with the Sonthal in the use of the axe, the former is awkward and slow compared with the active Sonthal, nearly one-half of whose existence is spent felling trees.

At Merapara, descended the hills to some extensive Sonthal clearings situated on the banks of the Morel hill torrent, which is the principal drainer of the northern hills and flows to the south. The highland overhanging the Ganges and which is about two thousand feet in height sends no streams to the north, with the exception of a small stream which flows from the Motee-jhurna waterfall, situate to the south of Sikreegullee.

The hill-men in my company on coming within sight of the Sonthal clearings, complained bitterly as, indeed, did Kesoo Sirdar at Sunuria, of the encroachments of their lowland neighbours; they said that the Sonthals were occupying all their vallies, were very saucy and would not leave their clearings, alleging that they had received leases from Mr. Pontet and move they would not. The fact is, the hill-men will not cultivate the valleys and do not like to see any one else cultivate them. Mr. Pontet freely invites the hill-men to take the Sonthals' fields and use the land rent-free, but if they will not use the land nor cultivate it, he immediately allows the Sonthals to take possession.

In several spots, the Sonthals have actually got possession of vil-

lages *on* the hills, so that the hill-men have every reason to fear the encroachments of their neighbours the Sonthals.

At the Sonthal clearing of Nargunjo now a twelvemonth old, it was distressing to see the enormous waste of valuable timber; fine large trees of many feet diameter were prostrate in every direction, hundreds of other still larger trees stood erect, but withered, being too large for the small Sonthal axe to cut entirely through they had been merely girdled, which operation consists of cutting a deep notch of four inches or more in width and depth completely round the tree; in a few months, every leaf falls off and at the end of the year all the smaller branches disappear, next the bark peels off in huge flakes, leaving the main stem standing like a ship's mast and which weathers the storms for many years.

In one field of mustard near Nargunjo, I saw upwards of fifty-five timber trees standing in this naked condition offering a melancholy and curious contrast to the neighbouring green and luxuriant forest, with which the field was entirely enclosed.

In a few years not a tree will be left in these now timber-crowded valleys, almost the whole of the large Sál forests have already perished under the operation of girdling for the production of the resin known as Dammer or Dhoona.

The hills being entirely closed in to the north and as there is no possibility of getting this valuable timber over the hills to the Ganges, which is only a few miles from the forests, averaging from four to twelve miles, the whole of the felled trees will, and are permitted to, rot on the ground.

Amongst the hill-men, who accompanied me this morning I noticed the following diseases; blindness from white film; varicose veins in the calf of the leg; secondary syphilis, and goitre: fever and ague is also common amongst the inhabitants during the months of September and October.

At the foot of the hills, I passed through a great quantity of a hoplike looking bush called by the Sonthals Chapoor. I am unacquainted with its botanical name, or with the names of many to me, unknown plants, and trees, daily met with in these hills.

Rocks passed over to-day were laterite overlying compact basalt.

At Banji, in addition to the Churruk poojah pole which graces, or

disgraces, every Sonthal village of any note, I here found a board armed with sharp nails, on to which the worshippers are tied, the nails piercing their backs, and in this state are swung round as in the Churruk or swing poojah of the Bengális, and from whom I imagine the Sonthal has borrowed the rite and its attendant festival. I also observed a horizontal gymnastic bar used by the athletes of the village during the same festival.

4th February, 1851.—Direction south, ten miles to Burio Bazaar, a fine Sonthal village a mile from the banks of the Morel, or Morung Nullah.

At starting, got upon Mr. Pontet's Rajmahal road which runs mostly through fine timber forest, with extensive Sonthal clearings and numerous villages.

At the fourth mile passed between basaltic hills beautifully wooded to the summits.

At the seventh mile, is an old ruined mud fortification, it is a square, composed of an outer mound of earth measuring a mile and half in circumference; the excavation for the erection of which forms a wet ditch, filled with water, enclosing an inner Fort higher than the neighbouring ground and contains a few brick walls and the remnants of a Hindu temple, which has been completely lifted from its foundations by an enormous Banian tree, that has enveloped the whole building, unroofed it and destroyed the walls; masses of detached masonry suspended in the tree is all that remains of the building.

Both the outer and inner Forts are overrun with jungle, palm-trees, fine forest trees, bamboos, grass and marsh weeds, amongst them I saw the beautiful Jacana upheld by his long and delicate claws hurrying across the floating reeds and grasses.

This Fort was, it is asserted, built by a Khetri Rajah of Munheearee, but when or for what purpose is no longer remembered.

From Burio, it is Mr. Pontet's intention to cut a road over the hills, to the east of the valley, so as to connect Rajmahal, which is only fourteen miles east of Burio, with the valley. This road should engage the attention of the Post Master General at Calcutta, for when once this road is opened, all necessity for conveying the Daks during the rainy season round by Sikreegullee, Peerpointee and Colgong by water, for which purpose three boats with their crews are kept up, will be at

once obviated, as there will be a high and dry road from Rajmahal to Bhaugulpoor, and only four miles of hilly and jungle road in the whole route. The only engineering difficulty is the Morell Nuddie, to the east of Burio, which during the rainy season brings down an immense body of water and a quantity of trees, and although the bed of the Nullah is from twenty-five to thirty feet deep, but very narrow, the water occasionally leaves it and spreads over the country, this, however, only occurs every fifth or sixth year and the water soon runs off again.

Purchased of the Sonthals at this place a quantity of plaited and twisted cow tail hair necklaces, that are worn by both sexes. These ornaments are made by the cow herds whilst herding the cattle, and are of great beauty and delicacy; many handsome necklaces of thirty and forty strands, each strand composed of triple plaited hair were offered for sale for four annas or six pence English money each necklace.

5th February, 1851.—Direction south, eleven miles, to Burhyte road the whole way over basalt and black cotton soil producing fine crops of rice, &c. The basalt everywhere resolving by the process of exfoliation into a grey spotted wacké leaving the hard ferruginous globular nuclei scattered about the country.

At Ruksee two miles north of Burhyte, is a spring of cold water issuing in a fine stream from a red gravel bank, composed of pisiform iron ore, and a red clayey soil; the supply of water is seven hundred and twenty gallons per hour, and supplies the village with good water. A few yards to the south is a northern but weaker spring, the water of which is not used.

6th February, 1851.—Direction south, ten miles through a rugged country destitute of roads, but well inhabited and well cultivated. The view from the road at Jussiadih, looking over the Burhyte valley back by the well occupied Chuperbhita hills is very pleasing. Ascended and crossed over the basaltic hill Chooklo, passing through a hill village by name Mori, where all the women were clothed no higher than the waist. Descended into the Murgo pass to Putwara where there is a hill village, the women of which were in the same costume as at Mokri. The hills to the south of the pass are very high and prettily broken into ravines well wooded, and the summits studded

with hill villages; large patches of cleared land with the Kirbee or stalks of the Indian corn and Junera still standing are seen on all parts of the hills.

The whole of the rocks passed over to-day were compact and earthy basalt.

7th February, 1851.—Direction south, eleven miles, to Soorujbara on the right bank of the Thorai Nuddie, one of the drainers of the eastern hills. The country passed over was very broken, and uneven and undulating considerably, exposing naked sheets of basalt. Passed through much tree jungle composed principally of asun, dhow, siris and sakua, and through several fine Sonthal clearances, especially that of Leeteepara which is situated on high commanding ground.

Soorujbara is also situated on high ground commanding a very extensive view of the hills and of the low-lands at their base.

The weather throughout the day was highly oppressive, although the thermometer in the shade never exceeded 73°. Numerous electric minature whirlwinds were travelling about the country; gentle wind from the east with a few clouds.

A violent thunder-storm occurred at midnight accompanied by heavy rain and high wind from the west, which drove me from my tents, taking refuge in the Bungalow close by.

8th February, 1851.—Direction west, about eight miles, through a very heavy forest of sal, sakua, asun and dhow, over broken and raviney ground and low hills to Gowpara, the largest village in the hills; containing about eighty houses and four hundred souls. The village is situated on the summit of a high range of hills which here form the central or largest group. The village is surrounded by neat hurdle fences enclosing tobacco, mustard, plantains, date and palm-trees, and in the centre of the village and around the houses are numerous fine palm trees, tamarind, peepul, mango, jack, clumps of bamboos and plantains; the houses are neat; numerous cattle sheds, pig-sties and well-stocked granaries bespoke plenty and comfort.

My arrival seemed to have struck a panic into the minds of the whole population, for on entering the village I could not find a single soul to speak to; every one had fled to their houses and fastened their doors.

Fortunately a fine old man who was on the roof of his house laying

out tobacco to dry in the sun, and who was ignorant of our arrival was caught; his trepidation at the appearance of myself, servants and elephant was most painful, and not without much persuasion could he be induced to descend from his house for the purpose of showing us the Mangi's residence; a house was pointed out as being that of the Mangi's, but it was, as was every house in the village, closed. I took up my residence in the verandah, where hung bows and poisoned arrows, deer horns, wild boar skulls, pea-fowl eggs and the cocoon of the wild silk or Tusser. The Mangi soon arrived from the jungle, carrying on his shoulder the produce of his morning's work, a log of wood; he was so alarmed at my appearance that he was speechless, but after an hour's persuasion, talking and laughing he gradually thawed, and told me that he had never before seen a white man, nor an elephant, nor had any one individual out of the four hundred inhabitants of his village ever seen one or the other. The ice being now broken, and the reason of his timidity known, I endeavoured to prove to him that a mortal with a white face was not the dreadful creature he imagined; I presented him with an empty bottle, a quantity of beads, gilt buttons, bodkins, ornaments for the women's hair, and told him to assemble all the children of the village; to whom I presented in succession three or four strings of beads and a handful of buttons. I now had the whole village with me and turning round I perceived the Mángi's house doors wide open and about fifteen females old and young standing behind me, into the midst of whom I threw a quantity of the hair ornaments consisting of tufts of Tusser silk, dyed scarlet and tied with black cotton; to the children in the Mangi's house I distributed a quantity of copper money, bargained with the Mangi with a quantity of empty bottles and money for poisoned arrows, bows, and grass hammocks, bade him good-bye and strongly recommended him next time he met a European to be more at his ease and not to be afraid of him, as no one had the most remote idea of doing any harm to any one in the hills; on the contrary, that we were all desirous of seeing so worthy a race happy and contented.

I was amused at the Mangi's repeated question put to me in a most serious tone, as to whether I had of my own free will given him the empty bottle, my first gift to him; upon my assuring him that my gift, a most invaluable one to him, and whence his utter unbelief of my

disinterestedness in the matter, had given me as much pleasure in the making as it had him in the receiving, he seemed partly satisfied, but repeated the question at intervals during my stay at the village.

The men of these central hills tie their hair much more on the back of the head than do the men further north, neither have they the flattened noses nor such thick lips as their northern brethren; neither do they pay that attention to dressing their hair or ornamenting their ears or necks with beads and trinkets which is so striking a feature in the northern tribes; the women in the same manner have scarcely any ornaments, are poorly dressed and untidy in their appearance; their great distance from any market or bazar may in a measure account for the difference of dress.

The Mangi gave me six young men with axes to cut a road through the forest; I started in a northerly direction through the finest sakua jungle I have yet seen in the hills; the trees are all of the very largest growth, affording an abundance of good timber; a few sal and dhow trees are in company with the sakua.

To my right, as the path inclined to the west, I had a high range of thickly wooded hills; to the left a deep valley filled with fine Sonthal clearings, the road lying along a perfectly level steppe of trap, the decomposition of which has clothed the hills with a jet black soil, highly productive of vegetable life. As usual the forest met over head forming a complete shelter from the sun's rays.

On these hills, I found an abundance of a bulbous root, which I take to be the squill, it is as large as a common onion and intensely bitter; the Sonthals use it to thicken newly woven cloth, by applying its bitter juice to the surface of the piece.

On the right of our party and far up the hill, a furious drumming and screaming was being carried on, which proved to be a party of hill-men driving from the neighbourhood a leopard that had been annoying their cattle.

In the thickest parts of the jungle, I fell in with several places of worship as used by the hill-men; the spots are generally occupied by two upright posts supporting a horizontal one. On the latter were threaded so to speak, several old baskets, calabashes, earthern pots, rings of date leaf, an old wooden mortar without a bottom, bundles of leaves tied up like a porter's knot, bamboo winnowing baskets and

string hammocks; at another "Gosainthan" as these spots are called, I found the horizontal pole supporting numerous bamboo bows and arrows, battle-axes made of bamboo with date leaf blades, and numerous date leaf rings; at a small distance removed and laid in the foot path, were several small earthen-ware cups filled with blood mixed with spirit, and near the cups was a bundle of staves and bamboos such as are used by the hill-men when walking. The whole of these articles are offerings made to Bedo Gossain either as votive offerings, for expected or hoped-for blessings, or as offerings of thankfulness for benefits received.

At sunset, I ascended the Sendgursa hill by a very steep ascent, from the summit of which I had the finest view of coup d'œil yet obtained of the hills; the hill is about two thousand feet above the sea, and from its summit I could see the following remarkable landmarks; the Monghyr hills to the north-west, distant eighty miles, with a G. T. S.* on the hill Maruk: the G. T. S. Mundar hill in Bhágalpur half way, or forty miles distant. The Ganges at Bhágalpur, distant sixty miles in N. N. W. direction; the long reach of the Ganges extending to Rampur Bauliah, seventy miles in an E. S. E. direction; the whole of the country lying between the foot of the hills and the military station Berhampoor on the Bhagretti, extending over fifty miles. To the south G. T. S. on the Satbor hill in Belputta, distant forty miles appeared topping the whole of the Katicoond carboniferous range. To the W. S. W. distant fifty miles the Teeur hill another G. T. S. and all the small detached hills of Beerbhoom, as well as the hills of Heudweh and Pusseje appeared, amongst the latter are the Nugwan and Puchpuhar hills both G. T. S. In a S. W. direction, the great Parusnath mountain is visible, distant one hundred miles. This mountain, in height nearly five thousand feet, has a G. T. S. on its summit and forms the culminating point of the rocks of the great primitive plateau extending from Beerbhoom to the Dunwah Ghaut.

To the S. S. W. the view extends over the Burdwan coal fields; and to the S. S. E. over the whole of the eastern portions of Beerbhoom and Burdwan; with the whole of the southern Rajmahal hills and surrounding forests, as a foreground, whilst the view of the hills

* G. T. S. Great Trigonometrical Survey Station.

at my feet was most complete, I could see into every valley, count every village and trace the outlines of the hills and valleys.

Descended the Sendgursa hill and ascended the Sootlee hill to Busko, a small hill village, from whence I was enabled to examine a deep valley to the north-east. The summit of the Sootlee hill is composed of laterite, highly sonorous when struck; the noise of the foot-falls of my party walking along sounded, like a body of men pasing over a drawbridge, and I noticed that the naked foot produced a much louder sound than was produced by those wearing shoes. I attribute this sound to the cellular nature of the rock and to the thin stratum of earth covering it; this sonorous rock lasted for a mile, the notes ascending and descending a whole octave according to the nature of the rock below.

Slept in a hut at the village of Balkumi to the north of the Sendgursa hill.

As sunset drew near the air was filled by a vast flight of the winged white ants (termes) which took their flight from numerous orifices in the ground, close to the hut in which I had taken up my quarters.

These flights generally take place during the rainy season or in August and September; they are the females who having arrived at perfection, leave home to seek a nest of their own, where they become the queen ant.

Out of the myriads that go forth to seek their fortune, a very small proportion can ever reach their destination, as every bird and beast in the creation appears to devour them with avidity. At my feet a hill-dog was eating the insects by hundreds as they crawled from the earth; the bats had left the shelter of the palm trees and were attacking them; as also were a numerous flock of Minas, who although they had betaken themselves to roost nevertheless left their trees and made a feast off these delicious insects. Cattle, horses, kites, crows, deer, sheep and goats, and indeed, almost every animal, devour this all-destroying insect, who in return, as every one in India well knows to his cost, spares nothing inanimate during its wingless state.

9th February, 1851.—Direction south. Descended by the same steep ascent of yesterday to Dangapara, in a deeply wooded valley in which the pea-fowl were very numerous and noisy.

Travelled twelve miles in a southerly direction through a deep val-

ley full of Sonthal villages to Umrapara, on the banks of the Banslooee Nuddie.

At the sixth mile or near Domuraheer, passed over a flooring composed of the heads of basaltic columns. The rock throughout this long valley affects the columnar shape and in the Ekri nullah which drains the valley, masses of basalt are to be seen that have assumed a cylindrical shape measuring twelve feet in circumference.

10*th February*, 1851.—Immediately to the east of the Bungalow at Umrapara, the bed of the Banslooee Nuddie is crossed by a broad belt of basalt, causing a fall in the stream of about twelve feet; the basalt is thickly disseminated with nests of radiated, acicular and tabulated zeolite. The acicular specimens are of great beauty, some of the nests measuring four inches in length, with crystals of a microscopic fineness half an inch in length; the flat or stilbite specimens appear in large flat plates of a pearly lustre exceedingly soft, yielding to the nail; the basalt is of a dark green approaching to black, is very tough and heavy, has a sharp angular fracture and is highly magnetic. The rocks from the action of the water are worn into deep smooth cups, varying from the size of a tea-cup to that of a large cauldron.

In the centre of the nullah, below the falls and detached from the general mass of rocks, over which the water spreads, is a group of colossal basaltic columns; one of a pentagonal form I found by measurement to be forty-eight feet in circumference. The columns are free from zeolite.

From Umrapara, direction south, eight miles, I visited the Doobrajpoor and Gopeekandur coal beds. The coal is found in the Tircultia or Tirputtee nullah which flows in a valley between sandstone hills, and near the two Sonthal villages above mentioned. The coal which forms the bed of the stream for about half a mile at Doobrajpoor is slaty and good for nothing, what may be below it remains to be seen.

The following is a vertical section through the bank of the Tircultia, down to the water level.

	Feet	Inches.
Dark coloured earth,	2	6
Slaty coal,	1	8
Sand with threads of coal,	3	6
Slaty coal,	1	2
Sandstone,	,,	,,

Another Section gives:

A friable carbonaceous soil, ...	2	6
Sandstone, ...	,,	5
Slaty coal, ...	3	,,
Friable grey sandstone, ...	,,	4
Slaty coal, ...	1	6
Tough ferruginous sandstone, ...	,,	5
Slaty coal, ...	2	6 bed of nullah.

Dip of strata, east. Strike, north and south. Between Umrapara and Doobrajpoor the rocks are sandstone with occasional beds of intruded basalt which enclose beds of zeolite.

In the valley known as the Puchwara pass a quantity of iron is smelted by a race named Nyas and exported to the plains or sold to the hill-men and Sonthals, after having been manufactured into coarse hatchets, plough shares and arrow heads.

At Selunji, where there is a bungalow, and in the bed of the Banslooee, the gneiss with its accompanying dykes of greenstone, have been laid bare by the action of the water of the river; and to the north of the river about a mile distant coal with shale and sandstone is found overlying these hypogene rocks. Coal is also found midway through the valley in a small nullah immediately to the south-east of the Koonda hill, and one mile west of the village of Puchwara; I have marked the spot on my map of the hills in the hope that some one having the leisure may visit the spot.

11*th February*, 1851.—Direction south, thirteen miles to Karodih, where there is a bungalow on the banks of the Tirputtee nullah, that flows over the Doobrajpoor coal beds, seven miles west from the Bungalow.

The whole of the march was over broken raviney and hilly ground, without roads. After crossing the Banslooee nullah, the footpath runs through a forest of dhow and sterculia, the ground strewed with agate and quartz crystals; nests of the latter are seen adhering to and embedded in a dark-coloured and tough basalt. At the ford of the river, stands a very handsome tree with dark foliage, the name of which I am unacquainted with; the natives call it kunda or grung, it bears a handsome globular pod containing two seeds, which when ripe are of a scarlet colour, from which is expressed an oil used for anointing cattle, and not human beings.

The pod when unripe is highly aromatic and milky. At the seventh mile passed over a bed of red and grey sandstone, one mile in width, which has escaped being overlaid by the neighbouring basalt, and which has been cut into by the action of the water of a small hill stream; it is the common coarse sandstone which is found in company with the coal at Doobrajpoor and of which bed it is an outcrop.

Passed under the small basaltic hill Kalipuhar, on which stands one of the masonry pillars demarcating the Damin-i-koh boundary. The hills about Karodih are low, round-backed and well wooded.

12*th February*, 1851.—Direction south-west six miles; over basalt for the first four miles; at the fourth mile sandstone is met with at the entrance of a prettily wooded valley flanked by low hills. Crossed the sandstone hills to Saltaha where there is a bungalow, on the banks of a hill torrent.

A heavy fog obscured the landscape during the greater part of the march. The basalt passed over this day was of a pale grey colour, embedding agate and chalcedony balls; and sometimes appearing as large slabs or floors of rock, at other spots as exfoliating into spherical masses. In the nullah south of the bungalow, the water has laid bare a flooing or mass of sandstone one foot in thickness, the whole divided into right-angled parallelograms of two feet in length by one foot in width. The regularity of the divisions and uniformity of the angles are very remarkable, both of which I imagine are the effects of desiccation. The sandstone overlies a soft friable white clay, and observing traces of coal in it, Mr. Pontet, whom I again met at this spot, at my requisition sent off a Sonthal up the nullah to look out for coal. He returned in the afternoon bringing specimens of a slaty coal which burnt very well. In the evening went to the spot, which is on the right bank of the nullah one mile south by east of the Sonthal village Chicheroo.

	Feet.	Inches.
The section in the banks shows earth,.....	3	,,
Sandstone,.....	9	,,
Slaty coal and shale,.....	,,	,,

13*th February*, 1851.—Direction five miles south-east to Moosuria bungalow, on the left bank of the Brahminee river. The road winds prettily under low basaltic hills, the lowland being sandstone and

shale, much disturbed by the intruding basalt. At Moosuria, half a mile north of the bungalow, coal crops out of the left bank of the Brahminey in several spots, as well as on the opposite or right bank.

The rocks in the river are sandstone, three feet thick overlying clay and shale. The former rock has been extensively quarried, but in a most expensive and curious manner; deep tank-like excavations have been made in the solid rock, instead of going to the exposed edge of the rock to procure slabs and blocks for millstones, which in former days were taken down the river to Bellia Narainpoor, a fine village belonging to Moorshedabad, and situate on the right bank, eight miles from the quarry.

In the evening marched along the banks of the Brahminey to Bellia Narainpoor. At Singhpoor, or at the sixth mile, the river dashes over a bed of basaltic columns of great extent, causing a fall in the stream of about eight or ten feet. To the west where the rock first appears, it is a waved floor of basalt having all the appearance of having but lately been poured out in a liquid state over the bed of the river; a little further east it becomes columnar; the columns being vertical or at right angles to the cooling surface; each column measuring four feet in circumference; further east the rock again becomes a solid mass, embedded in which are numerous large and small nests of elegant quartz crystals, and agate balls; the former of great beauty. Masses of pink felspar are also embedded in the basalt. The whole bed which crosses the river at right angles is about a quarter of a mile broad and is entirely free from sand. In one part of the columnar group the protruding heads of the columns have been by the united action of the atmosphere and running water worn into globes, all the angles of the polygons having disappeared, spaces have been left between the columns, and thus the ground is covered by round balls the size of bee-hives giving a curious appearance to the whole group.

14*th February*, 1851.—A few miles south of Bellia Narainpoor, the basalt ceases and is replaced by an extensive bed of nodular iron-stone which extends for thirty miles north and south, and about fifteen miles east and west; this bed of iron ore gives occupation to many hundred forges the produce of which is exported to Moorshedabad, all the neighbouring towns, and to Calcutta.

This extensive iron bed overlies granite and gneiss, both of which

rocks occasionally protrude through it; associated with the iron-stone are patches of ferruginous sandstone, various coloured clays, and actinolite.

List of Coal localities situated within the Damin-i-koh or Rájmahal Hills—as known in 1851.

No.	Description of locality.	Discoverer's name.
1.	In the Brahminee river, at Moosuria; which river forms the southern boundary of the Damin-i-koh. This coal extends to an unknown distance into Tuppeh Belputtah. An indifferent coal.	Mr. Pontet, 1838.
2.	In the Brahminee river, three miles north-west of No. 1, and one mile east of Domunpoor. This is an excellent coal.	Mr. Pontet, 1838.
3.	Three miles north of No. 2, are traces of coal in a small nullah, half a mile south of Chichroo.	Mr. Pontet and Captain Sherwill, 1851.
4.	Seven miles north of No. 3, are the extensive beds of the Gopikandur and Doobrajpoor valley. The coal hitherto produced is a bituminous slaty mineral.	Mr. Pontet, 1841.
5.	Four miles south-west in a small nullah (under the Dhunnia Puharee hill) which falls into the Goomra nullah is a bed of coal.	Mr. Pontet, 1841.
6.	Two miles north of No. 5, and half a mile north of the Nargunjo bungalow, in a nullah is a bed of coal.	Mr. Pontet, 1841.
7.	Situated immediately at the eastern foot of the Koondapuhar hill; which is one mile removed from the southern or right bank of the Bansbooee Nuddie, which flows through the Puchwara pass, and one mile west from the village of Mudhobun, is a bed of coal.	Captain Sherwill, 1851.
8.	At the western entrance of the Puchwara pass, at the village of Burgo, and on the left bank of the Bansbooee nullah, is a coal bed.	Mr. Pontet, 1844.

No.	Description of locality.	Discoverer's name.
9.	One mile due north from No. 8, situate in an enclosed valley, is a coal bed.	Mr. Pontet, 1844.
10.	At the entrance to the hills on the western flank by the Chuperbita pass, and under the lofty spur of a hill of the same name, and in the bed of the Goomani or Jumoonee nullah, are three beds of coal extending to a distance of two miles, and one mile further north-east are traces of coal in the same nullah.	Captain Sherwill, 1851.
11.	North sixteen miles, of No. 10, and twenty-four miles south of the Ganges, is the great Hurrah basin, with several outcrops of a slaty coal, associated with and underlying columnar basalt.	Captain Tanner, 1831.
12.	At the Bora Ghaut on the Gundaisree hill, which forms the northern boundary to the Hurrah basin, are traces of coal.	Captain Tanner, 1831.
13.	At the Motee Jhurna waterfall, overhanging Sikreegullee on the Ganges, are traces of coal, but in small quantities. The coal appears to have been charred and disturbed by the basalt, in the heart of which igneous rock the coal in several instances appears enclosed in detached nests, twelve feet in length. A large Rhinoceros looking fossil skull is seen embedded in the basalt. The summit of the hill, from whence the small stream forming the waterfall at this spot flows, is composed of basaltic columns resting on non-columnar basalt which latter rock envelops the coal.	Captain Tanner, 1831.

N. B. There is an untraced bed of fresh-water limestone in the northern portion of the hills, four miles south of the Teleeaghurhee Fort; and situated between the two small hamlets, Gurytee and Simurtollah.

Population return of the Rájmahal Hills or Damin-i-koh for the year 1851.

Names of Tribe.	Local Divisions.	Number of Villages.	Number of Houses.	Number of inhabitants, allowing 5 per house.	Remarks.
Mal or Maler. The Rájmahal Hill Tribe.	Rájmahal Hills.	921	6,756	33,780	This race inhabits the summits of the Hills only, and pay no taxes or ground rent to Government.
Sonthals.	Thannahs.				This race inhabits the valleys and lowlands and pay a ground rent to Government.
	1 Rájmahal, ...	385 (Paying-rent.)	4,185		
	2 Diggee, ...	294	3,823		
	3 Hurhurreea, ...	181	2,127		
	4 Doomka,.....	304	3,027		
		1,164	16,653	83,265	
	Scattered in the above 4 Thannas and not paying rent; not having been occupied three years, ...	309	3,493		
		309			
	Grand Total,....	2,394	23,409	117,045 or 103 souls per square mile area; Hilly tract being 1366.01 square miles.	

Statement showing the amount of Cultivation, Fallow and Waste Land in the Damin-i-koh or the Rájmahal Hills, for the year 1851.

Names of Tribes.	Acres under Cultivation and Fallow.	Square Miles.	Square miles, being within the Damin-i-koh boundary, which are occupied by Hills and uncleared forest, but which are culturable.	Total area of the Damin-i-koh, in square miles.	Remarks.
Mal or Hill Tribe, ...	35,840	56	....	....	The whole of this cleared land is on the Hills.
....	....	....	1056.01	1366.10	....
Sonthal, ...	1,62,560	254	....	....	This cleared land lies in the valleys and lowlands.
Grand Total,....	1,98,400	310	1056.01	1366.01	Which allows each inhabitant 6*d*. 0*r*. 34*pls*. acres upon the total or gross area; or 1*ac*. 2*rd*. 3*pls*. of cultivation.

Statement showing the amount of Assessment and approximate Expenditure on account of Damin-i-koh for the year 1851.

Expenditure.		Receipts, 1851.	Remarks.
	Co.'s Rs.		
Expenses for collecting the Revenue,..	340		It will be seen from this statement that the Damin-i-koh territory which supports the large population of 1,17,045 souls, also supports a Regiment of 400 men; and enables Government to grant 15,000 Rs. yearly as pensions to a half wild race who would were not they paid these trifling pensions, be an intolerable nuisance to the neighbouring districts.
Expenses for the Bhaugulpore Hill Rangers; about 400 men at 5 per mensem; besides officers, ...	30,000		
Superintendent's pay, ...	6,600		
Ditto travelling allowance, ...	360		
Ditto Elephants, ...	360		
Pensions paid to the hill chiefs and others; viz., 17 Sirdars at 10, .. 70 Naibs at 3,..... 435 Mangis at 2, ...	15,000	Co.'s Rs. As. P. 43,918 13 5½	
Total, ... 555 Pensioners.			
Grand Total Expenditure, ...	52,660	43,918 13 5½	Grand total receipts.

To Dr. A SPRENGER, *Secretary to the Asiatic Society.*

MY DEAR SPRENGER,—I have the pleasure to forward to you, for publication in the Journal of the Asiatic Society, a letter from W. Elliot, Esq. dated the 30th August, together with a comparative list of the Upanishads and extracts from the Mahávákya Ratnávali and the Muktika Upanishads, to which I added an English translation.

Mr. Elliot's list of the Upanishads, as received among the Telingana Paṇḍits,—the first complete one that has ever been published—will be of great value to all those who take an interest in those curious monuments of antiquity, and will, no doubt, induce other friends of Sanscrit literature, whose position gives them an opportunity of doing so, to collect similar lists among the Paṇḍits of different parts of India, especially at Benares, in the country of the Mahrattas and in Rajasthana.

Yours sincerely,

Howrah, 31*st Oct.* 1851. E. ROER.

To Dr. E. ROER, *Calcutta.*

Masulipatam, August 30*th*, 1851.

DEAR SIR,—On receiving the October number for 1850 of the Bibliotheca Indica (Vol. VII. No. 34) some weeks ago, I compared the list of Upanishads given in the preface, with those known to the Paṇḍits of this part of India (Telingana), and finding the variations to be considerable, I have thought that it might perhaps be interesting to you to see the result of my examination. I must premise however that I have never given my attention to this branch of Brahminical learning, and I trust therefore you will pardon me, if you find the particulars I now send, either crude or superfluous.

The number of Upanishads contained in your list (pref. v.—vii. note) compiled from those of Colebrooke, Weber, Anquetil du Perron, &c. is 95. The received lists of this part of India exhibit the larger number of 108. But in your list, different parts of the same Upanishad bear separate Nos., as for instance, the Mandukya, which in Colebrooke's list is entered "Nos. 12—15." Adopting these additional numbers wherever they occur in yours, the Telugu list is increased to 120. Of all these I have copies, or am able to procure them, besides which I possess three other works, termed Upanishads

though not found in the received lists. I enclose a memorandum marked A. showing the whole of these. The first column contains the numbers of the Telugu works arranged conformably to your list, founded on Colebrooke's, which (i. e. Colebrooke's) is given in the second column, Anquetil's in the third and the Miscellaneous Nos. from Weber and other sources in the fourth. The order of the numbers, I may remark, is derived only from the preface above referred to (No. 34 of Vol. VII.) and may not therefore be quite correct. The remaining works known to the Telugu Pandits then follow alphabetically, the three extra ones, being marked with a ;* viz. Nos. 87, 103 and 123, the last having been added subsequent to the preparation of the list. In the first of these three, the Mahávácya Ratnávali, an enumeration of the whole 108 Nos. occurs with a specification of the Vedas to which they belong. A similar list is likewise found in the Muctica Upanishad, No. 93 in my list. Extracts from these two works transcribed in Nágari characters and marked B and C are enclosed. I have made enquiry for the Ṭíca of Ánandagiri on the Swetaswatara Upanishad, but hitherto without success.

There is a notice in the last No. of the Journ. As. Soc. (III. of 1851, p. 283) inviting aid in procuring MSS. of the Sanhita of the Black Yajur Veda and its commentary by Sayanacharya. Copies of portions of these are not uncommon and no great difficulty would be experienced in collecting a complete set, both of the text and commentary. Most of them are in palm leaves, but some are on paper, all however are in Teulgu characters.

It will give me great pleasure if I can be of any assistance to join in the valuable labours in which you are engaged, by procuring for you any information which this province can furnish, but in doing so, I am sorry to say, I can bring no critical knowledge to bear on the value of such materials as may fall in my way.

I am, dear Sir,

Yours very faithfully,

WALTER ELLIOT.

A.

Nos. as per Telugu List.	Nos. in Colebrooke's List.	Nos. in Anquetil Du Perron's List.	Nos. in Dr. Weber's List.	Names of Upanishads.
1	1	4	..	Muṇḍakópanishad.
2	2	14	..	Prasnópanishad.
3	3	25	..	Brahmavidyópanishad.
4	4	33	..	Kshurikópanishad.
..	5	41	..	Chúlika.
5	6	9	..	Atharva *siró*panishad.
6	7	23	..	Atharva *sikhó*panishad.
7	8	28	..	Garbhópanishad.
8	9	16	..	Mahópanishad.
9	10	..	..	Brahma.
10	11	48	..	Práṇágni hótrópanishad.
11—14	12—15	31	..	Máṇḍúkyópanishad.
..	16	..	..	Nílarudra.
15	17	..	..	Nádabiudúpanishad.
..	18	..	..	Brahmabindu.
16	19	26	..	Amritabindúpanishad.
17	20	15	..	Dhyánabindúpanishad.
18	21	27	..	Téjóbindúpanishad.
19	22	20	..	Yógasikshópanishad.
20	23	21	..	Yógatatwópanishad.
21	24	..	..	Sanyásópanishad.
22	25	35	..	Áruṇikópanishad.
..	26	..	..	Kaṇṭhas'ruti.
..	27	..	..	Piṇḍu.
23	28	24	..	Átmavidyópanishad.
24—29	29—34	50	..	Nrisinha tápaniyya.
30—31	35—36	37	..	Kaṭhavalli upanishad.
32	37	46	..	Kénópanishad.
33	38	7	..	Náráyaṇópanishad.
34—35	39—40	30	..	Vrihannáráyana.
36	41	6	..	Sarwasárópanishad.
37	42	..	..	Hansópanishad.
38	43	34	..	Paramahansa parivrájakópanishad.
..	44	38	..	Ánandavalli.
..	45	39	..	Bhriguvalli.
39	46	..	..	Gáruḍópanishad.
40	47	..	..	Kálágnirudrópanishad.
41—42	48—49	..	..	Rámatápaniyya.
43	50	18	..	Kaivalyópanishad.

Nos. as per Telugu List.	Nos. in Colebrooke's List.	Nos. in Anquetil Du Perron's List.	Nos. in Dr. Weber's List.	Names of Upanishads.	
44	51	29	..	Jábálopanishad.	
..	52	..	..	Áśrama.	
45	53	1	..	Ch'hándógyópanishad.	
46	54	2	..	Vrihadáraṇyaka.	
47	55	3	..	Maitráyaṇi upanishad.	
48	56	4	..	Isávásyópanishad.	
49	57	11	..	Aitaréyópanishad.	
50	58	12	..	Koushítakópanishad.	
51	59	13	..	Śwétáswataropanishad.	
52—53	60—61	..	76—77	Gópálatápaniyyópanishad.	
..	62—66	..	78—82	Sundara tápini.	
54	67	..	83	Tripurá tapanópanishad.	
55	68	..	84	Tripurópanishad.	
56	69	..	85	Scandópanishad.	
..	70	..	86	Koula.	
..	71	..	87	Gópíchandanam.	
57	72	..	88	Darśanópanishad.	
58	73	..	89	Vajrasúchikópanishad.	
..	..	10	..	Hansanáda.	
59	..	17	..	Átmabódhópanishad.	
..	..	32	..	Shekl or Pankl.	
..	..	42	..	Amrat Lankoul.	
60	..	43	..	Amrita nádópanishad.	
..	..	46	..	Táraka.	
..	..	47	..	Arkhi.	
..	..	49	..	Savank.	
..	..	8	..	Tadéva.	
..	..	19	..	Sata rudriya.	
..	..	22	..	Śiva sankalpa.	
..	..	40	..	Purusha súkta.	
..	..	44	..	Váshkala.	
..	..	45	..	Tschakli.	
..	..	..	..	Rudra,	E. I. H. No. 1,686.
..	..	..	..	Atharvaṇiya rudra,	
61	..	..	..	Paingala,	
62	..	..	94	Nirálambópanishad.	
..	..	..	95	Śrimadatta (St. Petersburg.)	
63	..	..	90	Taittariyyópanishad.	
64	..	..	..	Adhyátmópanishad.	
65	..	..	..	Adwaitárkópanishad.	

Nos. as per Telugu List.	Nos. in Colebrooke's List.	Nos. in Anquetil Du Perron's List.	Nos. in Dr. Weber's List.	Names of Upanishads.
66	..	..	..	Akshamálikópanishad.
67	..	..	..	Aksbyúpanishad.
68	..	..	..	Annapúrṇópanishad.
69	..	..	..	Avadhútóponishad.
70	..	..	..	Avyaktópanishad.
71	..	..	..	Bahwrichópanishad.
72	..	..	..	Bhasma Jábálópanishad.
73	..	..	..	Bhávanópanishad.
74	..	..	..	Bhikshukópanishad.
75	..	..	..	Brihajjábálópanishad.
76	..	..	..	Dakshaṇá múrti upanishad.
77	..	..	..	Dattátréyópanishad.
78	..	..	..	Dévyupanishad.
79	..	..	..	Ekáksharópanishad.
80	..	..	..	Gaṇapatyupanishad.
81	..	..	..	Hayagrivópanishad.
82	..	..	..	Jábályupanishad.
83	..	..	..	Kalisantaraṇópanishad.
84	..	..	..	Kaṭhópanishad.
85	..	..	..	Krishṇópanishad.
86	..	..	..	Kuṇḍinakópanishad.
87	..	..	..	Mahávákya ratnávali.
88	..	..	..	Mahávákyópanishad.
89	..	..	..	Maitréyyupanishad.
90	..	..	..	Maṇḍala brahmópanishad.
91	..	..	..	Mantrikópanishad.
92	..	..	..	Mudgalópanishad.
93	..	..	..	Muktikópanishad.
94	..	..	..	Nárada parivrájakópanishad.
95	..	..	..	Nirwáṇópanishad.
96	..	..	..	Parabrahmópanishad.
97	..	..	..	Panchabrahmópanishad.
98	..	..	..	Parama hansópanishad.
99	..	..	..	Pásupada brahmópanishad.
100	..	..	..	Rahasyópanishad.
101	..	..	..	Ráma rahasyópanishad.
102	..	..	..	Rudrahridayópanishad.
103	..	..	..	Rudra Jábálópanishad.
104	..	..	..	Rudrákshópanishad.

Nos. as per Telugu List.	Nos. in Colebrooke's List.	Nos. in Anquetil Du Perron's List.	Nos. in Dr. Weber's List.	Names of Upanishads.
105	..	..	..	Sáṇḍilyópanishad.
106	..	..	..	Sarabhópanishad.
107	..	..	..	Saraswati rahasyópanishad.
108	..	..	..	Sárírakópanishad.
109	..	..	..	Sátyáyaniyyópanishad.
110	..	..	..	Sávitryúpanishad.
111	..	..	..	Sítópanishad.
112	..	..	..	Soubhágya laksmyupanishad.
113	..	..	..	Subálópanishad.
114	..	..	..	Súryópanishad.
115	..	..	..	Tárasárópanishad.
116	..	..	..	Trisikhi brahmaṇópanishad.
117	..	..	..	Turiyyátíta Avadhútópanishad.
118	..	..	..	Varáhópanishad.
119	..	..	..	Vásudévópanishad.
120	..	..	..	Yágnavalkyópanishad.
121	..	..	..	Yógachúḍámaṇi upanishad.
122	..	..	..	Yóga kuṇḍaly upanishad.
123	..	..	..	Gáyatri upanishad.

B. *Extract from the Mahávákya Ratnávali.*

ऋग्वेदादिविभागेन वेदाश्चत्वारः। तत्रैकविंशति शाखा ऋचः। नवाधिकशतशाखा यजुषः। सहस्रशाखास्साम्नः। पञ्चाशच्छाखा अथर्वणस्य। एकैकस्याः शाखाया एकैकोपनिषत्। आहत्याशीत्यधिकशतसहस्रसंख्याका उपनिषदः। तासु श्रीरामचंद्रेण रामदूताय सारतरोपनिषद अष्टोत्तरशतसंख्याका उपदिष्टाः। तथाच मुक्तिकोपनिषत्सा अष्टोत्तरशतनामश्लोका लिख्यन्ते।

तत्र दशोपनिषद ऋग्वेदगताः। शुक्लकृष्णभेदेन यजुःष्वेकपञ्चाशत्। तत्र शुक्लयजुःष्वेकोनविंशतिः। कृष्णयजुषो द्वात्रिंशत्। साम्नः षोडश। अथर्वणस्यैकत्रिंशत्। आहत्याष्टोत्तरशतं।

1. There are four Védas according to the division of them into Rig, Yajur, etc. Vedas. There are 21 schools of the Rig, 109 of the

Yajur, 1000 of the Sáma and 50 of the Atharvaṇa. To every school belongs one Upanishad. There are in total 1180 Upanishads. The venerable Rámachandra instructed his messenger (Hanumán) that among them, 108 are principal Upanishads; accordingly in the Muktiká Upanishad several Slokas are written, containing the names of 108 Upanishads.

With reference to this the Rig Véda contains 10 Upanishads, the Yajur in its two divisions, viz. the white and the black Yajur, 51, viz. the white 19 and the black 32, the Sáma 16, and the Atharvaṇa 31; in total 108.

C. *Extract from the Muktiká Upanishad.*

राम वेदाः कतिविधाः तेषां शाखाश्च राघव ।
तासूपनिषदः काः स्युः कृपया वद तत्वतः ॥
ऋग्वेदादिविभागेन वेदाश्चत्वार ईरिताः ।
तेषां शाखा ह्यनेकाः स्युः तासूपनिषदस्तथा ॥
ऋग्वेदस्य तु शाखाः स्युः एकविंशति सङ्ख्या ।
नवाधिकं शतं शाखा यजुषो मारुतात्मज ॥
सहस्रसङ्ख्या जाताः शाखास्साम्नः परन्तप ।
अथर्वणस्य शाखाः स्युः पञ्चाशद्भेदतो हरे ॥
एकैकस्यास्तु शाखाया एकैकोपनिषन्मता ।
विदेहमुक्ताविच्छा चेदशोत्तरशतं पठ ॥
तासां क्रमं सशान्तिं च शृणु वक्ष्यामि तत्वतः ।
ईशा केन कठ प्रश्न मुण्ड मांडूक्य तित्तिरिः ॥
ऐतरेयं च छान्दोग्यं बृहदारण्यकं तथा ।
ब्रह्म कैवल्य जाबाल श्वेताश्वो हंस आरुणिः ॥
गर्भो नारायणो हंसो बिन्दु नाद शिरः शिखा ।
मैत्रायणी कौषीतकी बृहज्जाबाल तापिनी ॥
कालाग्निरुद्र मैत्रेयी सुबाल क्षुरि कान्तिका ।
सर्व्वसारं निरालम्बं रहस्यं वज्रसूचिकं ॥
तेजो नाद ध्यान विद्या योगतत्वात्मबोधकं ।
परिव्राट् त्रिशिखी सीता चूडा निर्वाण मण्डलं ॥
दक्षिणा शरभं स्कन्दं महानारायणाऽद्वयं ।
रहस्यं रामतपनं वासुदेवं च मुद्गलं ॥

शाण्डिलं पैंगलं भिक्षु महच्छारीरकं शिखा।
तुरीयातीत सन्यास परिव्राजाऽक्षमालिका॥
अव्यक्त एकाक्षरं पूर्णं सूर्य्याध्यऽध्यात्म कुण्डिका।
सावित्र्य आत्मा पाशुपतं परब्रह्म अवधूतकं॥
त्रिपुरातपनं देवी त्रिपुरा कठ भावना।
हृदयं कुण्डली भस्म रुद्राक्ष गण दर्शनं॥
तारसार महावाक्य पञ्चब्रह्म अग्निहोत्रकं।
गोपालतपनं कृष्ण याज्ञवल्क्यं वराहकं॥
शाट्यायनी हयग्रीवं दत्तात्रेयं च गारुडं।
कलि जाबाल सौभाग्य रहस्य ऋच मुक्तिका॥
एवमष्टोत्तरशतं भावनात्रयनाशनं।

अथ हैनं श्रीरामचन्द्रं मारुतिः पप्रच्छ ऋग्वेदादिविभागेनैव एथक् शान्तिमनुब्रूहीति। स होवाच श्रीरामः। ऐतरेय कौषतकि नादविन्दु आत्मबोध निर्व्वाण मुद्गल अक्षमालिका त्रिपुरा सौभाग्य बह्वचानामृग्वेदगतानां दशसंख्याकानामुपनिषदां वाङ्मे मनसीति शान्तिः।

ईशावास्य बृहदारण्यक जाबाल हंस परमहंस सुबाल मन्त्रिका निरालम्ब त्रिशिखीब्राह्मण मण्डलब्राह्मण अद्वय तारक पैंगल भिक्षु तुरीयातीत अध्यात्म तारसार याज्ञवल्क्य शाट्यायनी मुक्तिकानां शुक्लयजुर्वेदगतानामेकोनविंशतिसङ्ख्याकानामुपनिषदां पूर्णमद इति शान्तिः।

कठवल्ली तैत्तरीयक ब्रह्म कैवल्य श्वेताश्वतर गर्भ नारायण अमृतबिन्दु अमृतनाद कालाग्निरुद्र क्षुरिका सर्व्वसार शुकरहस्य तेजोबिन्दु ध्यानबिन्दु ब्रह्मविद्या योगतत्त्व दक्षिणामूर्त्ति स्कन्द शारीरक योगशिखो एकाक्षर अक्षि अवधूत कठरुद्र हृदययोग कुण्डलिनी पञ्चब्रह्म प्राणाग्निहोत्र वराह कलिसंतरण सरस्वतीरहस्यानां कृष्णयजुर्वेदगतानां द्वात्रिंशत्सङ्ख्याकानामुपनिषदां सह नाववत्विति शान्तिः।

केन छांदोग्य आरुणि मैत्रायणि मैत्रेयी वज्रसूचक योगचूडामणि वासुदेव मह सन्यास अव्यक्त कुण्डिका सावित्री रुद्राक्ष दर्शन जाबालीनां सामवेदगतानां षोडशसंख्याकानामुपनिषदामाप्यायंत्विति शान्तिः।

अत्र मुख्य माण्डूक्याऽऽथर्वशिरोऽथर्वशिखे बृहज्जाबाल नृसिंहतापनी नारदपरिव्राजक सीता शरभ महानारायण रामरहस्य रामतापनी शाण्डिल्य परमहंसपरिव्राजक अन्नपूर्ण सूर्यात्म पाशुपत परब्रह्म त्रिपुरातपन देवी भावना भस्म जाबाल गणपति महावाक्य गोपाल-तपन कृष्ण हयग्रीव दत्तात्रेय गारुडानामथर्ववेदगतानामेकत्रिंशत् संख्याकानामुपनिषदां भद्रं कर्णेभिरिति शान्तिः।

1. O descendant of Raghu, Ráma, how many Védas are there, and among them how many schools (Sákhas), and which are the Upanishads of the latter? In pity tell me this according to the truth.

2. (Ráma answers:) Four Védas are known according to the division of them into Rig, Yajur, etc. Véda. The schools of them are numerous, and in the same manner their Upanishads.

3. The number of schools of the Rig Véda is 21, of the Yajur 109, O son of Márut (of the wind, Hanumán).

4. 1000 in number are the schools of the Sáma, O fear of enemies; and of the Atharvaṇa 50, according to division.

5. It is agreed, that to each Sákha belongs one Upanishad. If it is a desire for liberation without body (what constitutes an Upanishad) then say, there are 108.

6. Listen to their order and their formula of benediction. I will speak in truth. 1, The Íśa. 2, Kéna. 3, Kaṭha. 4, Prasna. 5, Muṇḍa. 6, Máṇḍúkya. 7, Tittiri.

7. 8, Aitaréya. 9, Chandogya. 10, Brihadáraṇyaka. 11, Bramha. 12, Kaivalya. 13, Jábála. 14, Śwétáswatara. 15, Hansa. 16, Áruṇi.

8. 17, Garbha. 18, Náráyaṇa. 19, Hansa (Parama H.) 20, Vindu (Amrita V.) 21, Náda, (Amrita N.) 22, Śiras (Atharva S.) 23, Śikhá. 24, Maitráyaṇí. 25, Kaushatakí. 26, Brihadjábála. 27, Tápiní.

9. 28, Kálágni Rudra. 29, Maitréya. 30, Subála. 31, Kshurika. 32, Mantrika. 33, Sarvasára. 34, Nirálamba. 35, Rahasya (S'uka R.) 36, Vajrasúchika.

10. 37, Téjas (Téjovindu). 38, Náda (Nadavindu). 39, Dhyána (Dhyánavindu.) 40, Brahma (Brahmavidyá). 41, Yogatattwa. 42, Átmabodha. 43, Parivráṭ (Paramahansa parivráṭ.) 44, Trisikhí (Trisikhí Brámhaṇa). 45, Sítá. 46, (Chúḍá) (Chulika.) 47, Nirváṇa. 48, Maṇḍala (M. Bramhaṇa.)

11. 49, Dakhsiṇá (D. Múrti.) 50, Sarabha. 51, Skanda. 52, Mahánárayaṇa. 53, Adwaya. 54, Rahasya (Saraswati R.) 55, Ramatapana. 56, Vasudéva. 57, Mudgala.

12. 58, Sáṇdila. 59, Paingala. 60, Bhikshu. 61, Mahá. 62, Síríraka. 63, S'ikhá (Yoga S'.) 64, Turíyátíta. 65, Sanyása. 66, Parivrája (Narada P.) 67, Akshamáliká.

13. 68, Avyakta. 69, Ekákshara. 70, Púrṇa (Anna P.) 71, Surya. 72, Akshi. 73, Adhyátma. 74, Kuṇḍiká. 75, Sávitri. 76, Átma. 77, Pás'upata. 78, Parabramha. 79, Avadhúta.

14. 80, Tripurátapana. 81, Dévi. 82, Tripurá. 83, Kaṭha (Rudra K.) 84, Bhávaná. 85, Hridaya (Rudra H.) 86, Kuṇḍalí. 87, Bhasma (B. Jábála.) 88, Rudráksha. 89, Gaṇa (G. Pati.) 90, Dars'aṇa.

15. 91, Tárasára. 92, Mahávákya. 93, Panchabramha. 94, Agnihotraka (Práṇa A.) 95, Gopálatapana. 96, Krishṇa (K. Tapana). 97, Yájnavalkya. 98, Varáha.

16. 99, Sátyáyaní. 100, Hayagríva. 101, Dattátréya. 102, Gáruḍa. 103, Kali (K. Santaraṇa). 104, Jábála. 105, Saubhagya. 106, Rahasya (Ra'ma R.) 107, Richa (Bahwricha). 108, Muktiká.

17. Then the son of the wind asked the illustrious Rámachandra: Pray, tell the different formulas of benediction for the Rig and the other Védas. The illustrious Rámachandra said: The formula of benediction for the 10 Upanishads of the Rig Véda, viz. 1, of the Aitaréya. 2, Kaushataki. 3, Náda-Bindu. 4, Átmabodha. 5, Nirváṇa. 6, Mudgala. 7, Akshamáliká. 8, Tripurá. 9, Saubhágya and 10, Bahwricha is, as follows: My word is placed in my mind, *and* my mind is placed in my word, etc.

18. The formula of benediction for the 19 Upanishads of the white Yajurvéda, viz. 1. of the Ís'ávasya. 2, Brihadáraṇyaka. 3, Jábála. 4, Hansa. 5, Paramahansa. 6, Subála. 7, Mantriká. 8, Niráṇ-

lamba. 9, Trisikhí-Brámhaṇa. 10, Maṇḍala Brámhaṇa. 11, Adwaya Táraka. 12, Paingala. 13, Bhikshu. 14, Turíyátíta. 15, Adhyátma. 16, Tárasára. 17, Yájnavalkya. 18, Sátyayaní and Muktiká Upanishads, is as follows: This is filled, and that is filled; the full is greater than the full, etc.

19. The formula of benediction for the 32 Upanishads of the black Yajur Véda, viz. 1, of the Kaṭhavallí. 2, Taittariya. 3, Bramha. 4, Kaivalya. 5, Swétáswatara. 6, Garbha. 7, Náráyaṇa. 8, Amrita Bindu. 9, Ámrita Náda. 10, Kálágni Rudra. 11, Kshurika. 12, Sarvasára. 13, Sukarahasya. 14, Téjobindu. 15, Dhyánabindu. 16, Bramhavidyá. 17, Yogatattwa. 18, Dakshinámúrti. 19, Skanda. 20, Síríraka. 21, Yogasikhá. 22, Ekákshara. 23, Akshi. 24, Avadhúta. 25, Kaṭha. 26, Rudrahridaya. 27, Yoga Kuṇḍaliní. 28, Panchabrahma. 29, Práṇágnihotra. 30, Varáha. 31, Kalisantaraṇa. 32, Saraswatí rahasya, is as follows: Do thou protect us, do thou preserve us, etc.

20. The formula of benediction for the 16 Upanishads of the Sáma, viz. 1, of the Kéna. 2, Chandogya. 3, Áruṇi. 4, Maitráyaṇi. 5, Maitréyí. 6, Vajra-súchaka. 7, Yogachúḍámaṇi. 8, Vasudéva. 9, Mahá. 10, Sanyása. 11, Avyakta. 12, Kuṇḍiká. 13, Sa'vitri. 14, Rudráksha. 15, Dars'aṇa; and 16, Jábálí, is as follows: Let all my members, my speech, etc.

21. The formula of benediction of the 31 Upanishads of the Atharva, viz. 1, of the Prasna. 2, Muṇḍa. 3, Máṇḍúkya. 4, Atharvasiras. 5, Atharvasikha. 6, Brihad Jábála. 7, Nrisinha Tápaní. 8, Nárada Parivrájaka. 9, Sítá. 10, S'arabha. 11, Mahánáráyaṇa. 12, Rámarahasya. 13, Rámatápaní. 14, Sáṇḍilya. 15, Paramahansa Parivrájaka. 16, Annapúrṇa. 17. Súrya. 18, Átma. 19, Pás'upata. 20, Parabramha. 21. Tripurá Tapana. 22, Dévi. 23, Bhávaná. 24, Bhasmajábála. 25, Gaṇapati. 26, Mahávákya. 27. Gopála Tapana. 28, Krishṇa. 29, Hayagriva. 30, Dattátréya. 31, Gáruḍa,—Upanishads, is as follows: O deities, let us hear auspicious words with our ears, etc.

Some Remarks on the foregoing lists of Upanishads, by E. Roer.

In comparing the list of Mr. Elliot (which is the same with that of the Mahávákya Ratnávali and the Muktika Upanishads) with the collection of Upanishads in the Atharva Véda, we find considerable differences between them.

1. Only 10 Upanishads in both list are equally assigned to the Atharva-Véda, viz.

1, Muṇḍa. 2, Pras'na. 3, Atharvasíras. 4, Atharvas'ikhá. 5, Máṇḍúkya. 6, Átma. 7, Nrisinha Tápana. 8, Brihadnáráyaṇa (Mahá N.) 9, Gáruḍa and 10 Rámatápaní.

2. Twenty-two Upanishads in the Atharva collection are assigned to other Védas in Mr. Elliot's list, viz.

To the Rig Véda (1.) 1, Náda Bindu.

To the White Yájur (3.) viz. 2, S'ikhá. 3, Jábála; and 4, Hansa.

To the Black Yajur (14.) viz. 5, Bramha. 6, Pra'na'gnihotra. 7, Amrita-Bindu. 8, Dhyána-Bindu. 9, Tejo-Bindu. 10, Kaṭha-Valli. 11, Náráyaṇa. 12, Kaivalya. 13, Kshurika. 14, Garbha. 15, Yoga S'ikhá. 16, Yoga Tattwa. 17, Kálágni Rudra. 18, Sarvasára.

To the Sáma (4.) viz. 19, Mahá. 20, Sanyása. 21, Áruṇya; and 22, Kéna.

3. Eight Upanishads belong exclusively to the Atharva collection, viz. 1, Chúlika. 2, Níla-Rudra. 3, Brahma Bindu. 4, Kaṇṭha S'ruti. 5, Piṇḍu. 6, Ánanda-valli. 7, Brigu-valli; and 8, Ásrama.

4. Twenty-one Upanishads, which according to the Muktika belong to the Atharva Véda, are not found in the Atharva collection. They are:

1, Brihad-Jábála. 2, Nárada-Parivrájaka. 3, Sitá. 4, Sarabha. 5, Ráma-Rahasya. 6, Saṇḍila. 7, Paramahansa-Parivrájaka. 8, Annapurṇa. 9, Surya. 10, Pasúpati. 11, Parabramha. 12, Tripura-Tapana. 13, Dévi. 14, Bhávaná. 15, Bhasma-Jábála. 16, Gaṇapati. 17, Mahávakya. 18, Gopala-Tapana. 19, Krishṇa. 20, Haya-Gríva; and 21, Dattatréya.

5. Anquetil du Perron's list also deviates from both Mr. Elliot's and the Atharva Véda list. It resembles, however, more closely the latter, as 27 Upanishads are the same in both lists, while it has only

8 of the Atharva Véda Upanishads in common with Mr. Elliot's list (viz. 1, Muṇḍa. 2, Pras'na. 3, Atharvas'iras. 4, Atharvas'ikhá, 5, Máṇḍúkya. 6, Átma. 7, Nrisinha-Tapaniya. 8, Brihad-Náráyaṇa.)

6. Thirteen Upanishads are counted in Anquetil's collection to the Atharva, which are assigned in Mr. Elliot's list to other Védas. (viz. 1, Kshuriká. 2, Garbha. 3, Maha. 4, Práṇa, (Pránágnihotra.) 5, Amrita-Bindu. 6, Tejo-Bindu. 7, Dhyána-Bindu. 8, Yogasikhá. 9, Yogatattwa. 10, Aruṇiya. 11, Kaṭhaka. 12, Kéna. 13, Náráyaṇa. 14, Paramahansa. 15, Kaivalya. 16, Jábála. 17, Amrita-Náda.

7. The following are exclusively found in Anquetil's list.

1, Hansanáda. 2, Atmabodha. 3, Shekl or Pankl, (Sákalya W.) 4, Amrita-Lankoul, (Amrita-Alaukara W.) 5, Táraka (perhaps Tárasára.) 7, Arkhi (Akshi?) 8, Saunaka (Savank.) 9, Padeva. 10, Sattarudriya. 11, Sivasankalpa. 12, Purushasúkta. 13, Váshkala. 14, Tshakli.

8. From the above comparison it is evident, that the three lists have been taken from different authorities, and it is probable, that yet more will be found, of different numbers and arrangement. Which of the treatises, called Upanishads, are taken from the Védas themselves, and which are added to them at a later period, cannot be decided, before all the Védas are published, when it will be possible, gradually to ascertain the time of their composition.

9. The whole number of Upanishads according to the three lists and other authorities is :

		and added the parts which in other arrangements are considered as different Upanishads.
Of the Telingana list,.....	108	 120
Added by Mr. Elliot,.....	3	 3
Of the Atharva Collection, ...	7	 7
Of Anquetil's list, ...	14	 14
Of other sources, ...	6	 10
	138	154

Literary Intelligence.

مختصر نافع *Mokhtaçir Náfi'*. This is an Arabic Law book, and holds with the Shiahs nearly the same place as Qodúry with the Sunnies. It begins like all Law books with purifications. The author's name occurs neither in the title page nor in the preface. The Editor probably did not know it. It is Najm aldyn Abú-l-Qásim Ja'far b. al-*H*asan b. Yahyá b. Sa'yd *H*illy, He died in A. H. 676, and is also the author of the Sheráyi' alislám which have been printed in Calcutta. A lithographed edition of the Mokhtaçir Náfi' has lately (A. H. 1267) been made at Delhi, it is in small 8vo. and has 248 pp. but very little can be said to its praise.

Besides the above, two Persian medical works have been lately (A. H. 1265) lithographed at Delhi. Both are in one volume, large 8vo. 287. pp. One is the Alfáz aladwiyyah of which Mr. Gladwin has published an English translation, Calcutta, 1793, 4to. The other is called تالیف شریف Tályfi Sharyf from its author Mo*h*ammad Sharyf Khán, a son of Mo*h*ammad Akmal Khán. The book is of great importance, inasmuch as it contains the Materia Medica of the Hindus. We have a free translation of it by Dr. Playfair. I may mention three other medical works which have been lithographed at Delhi.

علاج الامراض or Practice of Medicine in Persian. The date is a chronogram for A. H. 1257, when the book was composed. This is by the same Mo*h*ammad Sharyf Khán who compiled the preceding work. It was published in 1264, large 8vo. 611 pp.

طب اکبر A work on the Practice of Medicine in Persian by Mo*h*ammad Akbar, commonly called Mo*h*ammad Arzány, who some years ago was a celebrated Physician of Delhi. The practice laid down in this book is now generally in vogue among the Musulmans in India. Large 8vo. 644 pp.

تحفة المومنین Simple and compound Medicines explained in Persian by Mo*h*ammad Mumin Hosayny of Delhi. Large 8vo. A. H. 1266, 668 pp.

A. Sewell, Esq. Interpreter and Quarter-Master of the 47th Regt. N. I. has favoured the Secretary with the following account of new publications which have issued from the two Lithographic presses which formerly had been established at Lucknow, and were lately obliged to take refuge at Cawnpore.

From the Press of *H*ájjy Mo*h*ammad *H*osayn:

كليد دانش تصنيف كردهٔ عبد الفتاح بعلم فارسي • رساله قيافه مصنف نا معلوم • و ظفر جليل ترجمه كردهٔ نواب قطب الدين خان

Press of Mostafá Khán:

مشارق الانوار در علم حديث • و مصدر فيوض در قوانين فارسى • و پانچسورهٔ مترجم • و استفتاهاى شاه عبد العزيز

At Bombay the Akhlaq'e Náçiry has been lithographed, but the hand is so crammed that it requires particularly good eyes to read it.

Queries.

The Editor will feel obliged for any information on the undermentioned Queries.

A dispute has been raised in Germany on the meaning of the words في حدود سنة as for instance in the sentence مات عبدالله في حدود سنة ستين The expression is used frequently in biographical works, and it is therefore of great importance to know whether it means "about the year .. .. " or "within the year .. .. " or "towards the end of the year .. .. .."

Baron von Hammer Purgstall is very anxious to obtain a copy of the Díwân of Abu-l-Maâní, or at least some information regarding the poet.

Mr. N. Bland is preparing a Biographical Dictionary of Persian poets. Every one who takes an interest in Persian literature must have felt the want of such a work, and will no doubt be happy to contribute towards it. It is very likely that Tazkirahs not accessible to Mr. B. may be found in India, and I therefore give him a list of the Tazkirahs known, and should feel obliged if any one who finds one not mentioned in this list would inform me (A. Sprenger, in Calcutta) or Mr. Bland, (Royal Asiatic Society, London.)

* ۱ لباب الالباب تصنيف محمد عوفي
۲. تذكرة الشعراء دولتشاه
۳. اسمان سخن
* ۴ تذكرة علي شير
* ۵ خلاصة الاشعار و زبدة الافكار
۶ تحفة سامي
* ۷ تذكرة نفائس المآثر
۸ تذكرة طاهر ناصرابادي
۹ كلمات الشعرا تصنيف سرخوش
۱۰ همیشه بهار
۱۱ تذكرة المعاصرين شيخ حزين
۱۲ مرآة الخيال
۱۳ مقالات الشعرا
۱۴ انيس الاحبا
* ۱۵ يد بيضا
۱۶ آتشكدة
* ۱۷ مجمع النفائس
۱۸ رياض الشعرا تصنيف واله
* ۱۹ مجمع الغرايب
۲۰ سفينه خوشگو
۲۱ خزانه عامره
۲۲ تذكرة حسيني
* ۲۳ جواهر العجائب
۲۴ مخزن النكات
۲۵ سرو آزاد
۲۶ صبح وطن اعظم

Should copies be obtainable of the Tazkirahs marked with an asterisk I should be glad to purchase them.

Dr. Buist is preparing a work on the Meteorology of India, and would thankfully receive and acknowledge observations from various parts of the country, which may throw light on the subject; such as quantity of rain, and moisture of atmosphere, temperature and its variations, winds, terrestrial magnetism, general features of vegetation, great floods like the one which occurred in the Indus in July, 1841. &c.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL.

FOR SEPTEMEER, 1851.

At a Meeting of the Society held on the 3rd instant, at half past 8 P. M.

J. R. COLVIN, Esq. Senior Member of the Council present, in the Chair.

The proceedings of the last Meeting were read and confirmed.

Letters were read:

1st. From Dr. A. Campbell, Darjeling, presenting through Mr. J. R. Colvin, a skin with head and horns of the Shaw deer of Thibet, proposed by Mr. Colvin, and seconded by Mr. Heatly and

Resolved that the thanks of the Society be given to Dr. Campbell for this valuable present; and that, as recommended by the Curator, the specimen be mounted and placed in the Society's Museum.

2nd. From Captain Thuillier, Deputy Surveyor General presenting a set of the Revenue Survey Maps for the use of the Society's Library. The set comprises coloured lithographed Maps of the following districts:

North West Provinces.

Agra,
Allahabad,
Azimgur,
Bareilly,
Benares,
Bijnour,
Bulund Shubur,
Budaon,
Cawnpore,
Delhi,
Etawah,
Furruckabad,
Ghazeepore,
Goorgaon,
Goruckpore,
Hurianа,
Jounpore,
Meerut,
Mirzapore,
Moradabad,
Paneeput,
Pillibheet,
Rohtuk,
Shahjehanpore,

} Scale 4 miles 1 inch.

Map of Kumaon and British Gurhwal,
Map of the Territory of Marwar or Joodhpore,
Map of the Jeypore Territory,

} Scale 8 m. 1 in.

Bengal Provinces.

Sarun,
Behar,
Patna,
Shahabad,
Balasore,
Cuttack,
Pooree,
Midnapore,
Higillee,

} Scale 4 miles 1 inch.

Proposed by the Chairman, seconded by Major Baker, and unanimously

Resolved that the thanks of the Society be given to Captain Thuillier for these Maps and for his promise to present all such as may be hereafter issued from Surveyor General's Office.

3rd. From Cecil Beadon, Esq. forwarding a box containing bamboo traps for catching fish as used by the natives of Assam, also a few specimens of Machines for cleaning and spinning cotton peculiar to the province of Assam. Mr. Beadon observes that the specimens were destined for the London Exhibition by Mr. W. N. Hudson of Mungledye in Assam, but having arrived too late for transmission to England they are in accordance with the wishes of that gentleman made over to the Museum of the Asiatic Society.

Resolved that the present be acknowledged with thanks.

4th. From Captain Thuillier presenting a copy of a Manual of Surveying in India.

Ordered to be acknowledged with thanks.

5th. From Mr. J. W. Sherer, Officiating Assistant Secretary to the Government of the North West Provinces announcing the despatch of the following books presented to the Society by order of his Honor the Lieut. Governor, North West Provinces, viz. Battin's Report on Kumaon, Statistics of the North West Provinces, Statistics of Indigenous Education in the North Western Provinces, Directions to Revenue Officers.

Ordered that the present be acknowledged with thanks.

6th. From M. P. J. Ondaatjee, Esq., through the Right Rev. the Lord Bishop, presenting a copy of a Memoir of Dr. Quint Ondaatjee.

Ordered that the present be thankfully acknowledged.

7th. From Rájá Rádhákánt Deb Báhádur, the last volume of his Dictionary.

Ordered that the thanks and congratulations of the Society on the completion of this valuable work be communicated to Rájá Rádhákánt Deb.

8th. The Librarian laid on the table a list of books added to the Library during the month of August last.

The name of Lieut. Faithful, proposed and seconded at the last meeting having being brought forward for ballot—

It was resolved that the election of Lieut. Faithful be reserved for determination at the next meeting, as there were not eleven ordinary members then present.

The Council submitted a Report of the expenditure on account of the Bibliotheca Indica from the year 1847, to July, 1851, together with a list of works published with reference to a resolution passed at the last meeting.

Ordered that the Report be laid on the table.

The following communications were then read :

1st. A letter from W. Seton Karr, Esq., Under Secretary to the Government of Bengal, acquainting the Society that with the permission of the Military Board the Executive Officer of Berhampore will proceed to Gour to make drawings of the architectural remains there, in December next.

Resolved that the thanks of the Society be conveyed to his Honor the Deputy Governor for this communication.

2nd. A Report on the Kurrukpore Hills, by Captain J. R. Sherwill, communicated by Captain Thuillier.

3rd. On the Dust Whirlwinds and Cyclones, by P. T. H. Baddeley, Esq. M. D., communicated by H. Piddington, Esq.

Report of the Curator Museum of Economic Geology.

Economic Geology.—Captain Haughton has sent us from Suray Rela and some other localities in the Chybassa district, four specimens of copper ore with a bit of the smelted copper and one of common iron ore. I find upon

examination that one of the copper ores (No. 4) contains a small quantity of Bismuth, but the specimen sent is too small to afford a quantitative analysis. The specimens appear to promise well, and it is remarkable that this is the spot alluded to in my recent report to Mr. Secretary Beadon, as being the locality from whence the natives gave the late Major Ouseley specimens of mere iron ores for copper.

Mr. Lonsdale of Moulmein has sent a number of ores for examination, which prove to be nothing more than different kinds of iron ore, a few having small proportions of antimony, but none of any value.

Our Secretary has received from the Hon'ble J. C. Erskine, resident at the Court of Nepal, the following letter and the specimen therein alluded to, which has been examined: the report on the specimen, follows the letter.

No. 62 of 1851.

From the Hon'ble J. C. Erskine, *Resident, Nepal.*
To the Secretary to the Asiatic Society of Calcutta,
dated Nepal, the 14*th August*, 1851.

Sir,—I have taken the liberty of forwarding to you by Dâk to-day a specimen of a mineral somewhat resembling coal. Though deficient in Carbon it appears to be a kind of lignite, and was found about five or six miles from the city of Katmandoo.

2. Would you do me the favor of obtaining from one of the members of the Asiatic Society competent to pass a judgment on such subjects, a description of this mineral, for the information of the Prime Minister General Jung Bahadoor.

I have the honor to be, Sir,
Your most obedient servant,
(Signed) J. C. Erskine,
Resident, Nepal.

Report on a supposed specimen of lignite from Katmandoo.

This specimen is not lignite but a very promising coal shale and considerably bituminous, as will be seen below. The impressions and remains of plants which it contains are those of *calamites*, a plant of the coal formation. The bituminous portions are distinctly seen in the cross fracture in their waving lines of dull shining coal.

Carefully dried before analysing, as all these shales absorb much moisture in the rains, 100 grains of it gave,

Gaseous matter with water, ...	41.50
Carbon, ...	25.20
Ash, containing a small proportion of lime but principally iron and silica, ...	33.30
	100.00

Its specific gravity was not taken, as it is of too loose a texture and we have but too small specimens of it.

(Signed) H. PIDDINGTON,
August 27th, 1851. *Curator, Museum Economic Geology.*

Captain Sherwill has presented to the Museum small specimens of the native gold and Cinnabar of California, and Dr. Huffnagle has also presented us with a very beautiful specimen of the Auriferous Quartz from California, shewing the gold dispersed in minute spangles through the substance of the semi-transparent and opaque quartz.

I have carried on as a paper for the Journal the Table of our Examination of Indian Coals from that given by Mr. Jas. Prinsep in Vol. VII. p. 197, bringing it down to the close of Vol. XIX. for 1850; the two affording at once a full register of the Economic value of all our Indian and of some foreign coals.

We have received from Mr. Walter Elliott of the Madras Civil Service, a box of specimens collected by Lieut. Applegarth, M. N. I. near the bank of the Kistnah which it was hoped might contain organic remains indicative of coal, but there is nothing of the kind in them nor does even their lithologic character give any promise of the kind. As the excavations, however, are but superficial better success may attend farther research in more favorable spots.

H. PIDDINGTON,
Curator, Museum Economic Geology.

FOR NOVEMBER, 1851.

The usual monthly meeting of the Asiatic Society was held on the evening of Wednesday the 5th November last, at half past 8 P. M.

J. R. COLVIN, Esq. Senior member of the Council present in the Chair.

The proceedings of the September meeting were read and confirmed.

Donations were received—

1st. From Mr. Frederic Fitzgerald of Philadelphia. A Stone Tomahawk, or war hatchet, found on the Allighaney Mountains in the United States of America. Mr. Fitzgerald observes that "á withe of tough wood forms the handle of this hatchet, and that it must have been made before the discovery of America by the Europeans as iron very soon supplied the place of stone."

2nd. From D. C. Money and Rájá Ramchand Siñha. Three pieces of ancient Hindu Sculpture.

Resolved that Mr. Money and the Rájá be requested to favour the Society with an account as to the place where these interesting antiquities have been found.

From Messrs. Madden & Co. London, a copy of a History of Modern and Ancient India, by Cook Taylor.

From Mons. D. C. Wiedmann, Secretary to the Royal Academy of Sciences in Bavaria, the latest publications and transactions of the Academy.

From Captain G. Siddons, a MS. of the Vichitra Nátaka.

From the Court of Directors, a Catalogue of the Museum of the East India Company by Dr. Horsfield.

From Captain Thuillier, a very large portfolio for the district and general maps of India. This gentleman had further the goodness to arrange the maps and have them fixed in it. The special thanks of the Society were voted to the Captain.

From C. Murehead, Esq., Principal of the Grant Medical College. A report of the Grant Medical College for the Session 1850-51.

From Joseph Milligan, Esq. Secretary to the Royal Society of Van Diemen's Land.

The publications of the Royal Society of Van Diemen's Land.

With reference to Mr. Milligan's proposal for exchange of publication and specimens of Natural Products it was resolved—

That a set of the Researches as far as available and a complete set of the Journal be forwarded to the Society by an early opportunity, and that the request for exchange of specimens of Natural History be referred to the Council for report.

The Chairman stated to the meeting that Dr. O'Shaughnessy has very obligingly offered to explain the details of the Electric Telegraph now in operation between Diamond Harbour and Calcutta, to the members of the Asiatic Society, any day they may appoint between the hours of 11 A. M. to 3 P. M., and proposed that the thanks of the Society bé accorded to Dr. O'Shaughnessy for his kind offer, and that the members avail themselves of the same at 11 A. M. on Saturday the 15th instant, when a special meeting of the Society will be held at the Telegraph Office, Chandpaul Ghât.

Lieut. Faithful, duly proposed and seconded at the August meeting, was balloted for and elected an ordinary member.

The following gentlemen were named for ballot at the December meeting;

Captain R. V. Thurburn;—proposed by Dr. A. Sprenger, seconded by Mr. Colvin.

Captain Layard;—proposed by Captain Thuillier and seconded by Captain Sherwill.

The Council communicated for the adoption of the meeting, a report by the Philological Committee on the publication of texts in the Bibliotheca Indica.

Report.

The Committee is of opinion—

That whilst it is of the highest importance for translations to be made here in India with all Hindu assistance, it is not expedient to limit the publication of volumes in the Bibliotheca Indica to works which the editors may be prepared at once to translate. It is evident that such a restriction would operate unfavorably, as in many cases, years must be spent before a perfectly satisfactory translation could be finished.

At the same time the Section recommend that no work should be printed without so much critical apparatus as is necessary for giving an account of the MSS. made use of, their authority and age, &c. and a resume of the contents of the Volume.

Also that the Ishwar Chandra Sharmana's offer to edit the Sarbhadarshana Sangraha be accepted.

Also that Dr. Röer having offered to publish the second part of the *Naishada* with the commentary of Mallináth,—a work which has been recommended by Professor Lassen, Dr. Röer's offer be accepted.

Proposed by Mr. Colvin, seconded by Dr. Wálker and resolved that the recommendations of the Council be adopted.

Major Baker submitted for the inspection of the Society a drawing of a piece of Grecian sculpture found in Peshawur.

Bábu Rájendralál Mittra exhibited a set of electrotype impressions of the Roman gold coins lately submitted to the Society by General W. Cullen.

Notice was given by Dr. A. Sprenger that he would propose at the next meeting,

That the Museum of Natural History of the Society be offered to the Government for the formation of a Government Museum.

This proposal was referred to the Council for Report under the provisions of the Bye-laws.

Communications were received—

1st. From Mr. E. Thomas, enclosing a paper on certain ancient coins collected in Peshawur.

2nd. From Captain Thuillier, submitting an abstract of Meteorological mean annual summaries for ten years from 1841 to 1851.

From the same, forwarding a note on an inscription found in Monghyr with a drawing by Captain Layard.

From Bábu Radhanáth Sickdár, through Captain Thuillier. An account of the table used for reducing Barometrical observations to 32 Fahrenheit, in the Surveyor General's Office, Calcutta.

Resolved—that Dr. Fayerer be requested to favour the Society with such information as he may be able to obtain, regarding an inscription on the face of a rock near the Laur Thannah within ten miles of Sylhet.

Library.

The following additions have been made to the Library since August last.

Presented.

Memoir on the Statistics of Indigenous education within the North Western Provinces of the Bengal Presidency. Compiled from Official Documents under orders of the Hon'ble the Lieut.-Governor of the North Western Provinces. By R. Thornton, Esq. Calcutta, 1850. 8vo.—By the Government of the North Western Provinces.

Directions for Revenue Officers in the North Western Provinces. Calcutta, 1850, 8vo.—By the Same.

Official Reports on the Province of Kumaon with a Medical Report on the Mohámári in Gurhwal, in 1849-50. By J. H. Batten, Esq. Agra, 1851, 8vo.—By the Same.

Memoir on the Statistics of the North Western Provinces. By A. Shakespear, Esq. Calcutta, 1848, 8vo.—By the Same.

Selections from the Records of the Bengal Government, No. II. Report on the Nuddia Rivers. By Capt. Lang. By the Government of Bengal.

A Grammar of the Panjabi language with Appendices. Lodiana, 1851, 8vo. —By Sir Henry Elliot.

A Manual of Surveying for India. By Captains R. Smyth and H. S. Thuillier, Calcutta, 1851, 8vo.—By Capt. Thuillier.

Journal of the Bombay Branch of the Royal Asiatic Society, No. XIV. Vol. VI.—By the Society.

33 Revenue Survey Maps of the Bengal Presidency.—By Capt. Thuillier, Deputy Surveyor General.

Journal of the Ceylon Branch of the Royal Asiatic Society, No. V. for 1850.—By the Society.

A Brief Memoir of the Life of the late Peter Philip Jurgen Quint Ondaatjee, Colombo, 1851, 12mo. pamphlet.—By the Compiler.

Brief Lectures on Mental Philosophy and other subjects; delivered in Sanskrit to the Students of the Benares Sanskrit College, Allahabad, 1845, 12mo.—By J. Muir, Esq.

The Civil Auditor's Manual for the North West Provinces, by T. K. Lloyd, Esq. Calcutta, 1851, 4to.—By the Government of the North Western Provinces.

The Procedure of the Civil Courts of the East India Company in the Presidency of Fort William. By William McPherson, Esq. Part I. Calcutta, 1851, 4to.—By the Author.

The Vichetra Nátak in Punjabi. MS. 12mo.—By Capt. George Siddons.

Ancient and Modern India, by the late W. Cooke Taylor: revised by P. J. Mackenna, Esq. London, 8vo. 1851.—By Messrs. Madden & Co.

Papers and Proceedings of the Royal Society of Van Diemen's Land. Vol. I. pts. I.-II.-III.—By the Society.

Rules of the Royal Society of Van Diemen's Land. Pamphlet.—By the Society.

Lexicon Geographicum cui titulus est مراصد الاطلاع على اسماء الامكنة والبقاع. Tertius Fasciculus exhibens literas Djim-Kha. Edidit T. G. J. Juynbull. Lugduni Batavorum, 1851, 8vo.—By the Curators of the Academy of Leyden.

Life of Mohammad from original sources. By Dr. A. Sprenger. Allahábád 1851, 8vo.—By the Author.

Abhandlungen der köeniglich Bayrischen Akademie der Wissenschaften. Part I. of Vols. 26 and 27. By the Royal Academy of Munich.

Gelehrte Anzeigen, Vols. 30-31.—By the Same.

Bulletin der köenigl. Akademie der Wissenschaften.—Nos. 23-4.—By the Same.

Ueber die politische Reformbewegung in Deutschland im XV. Iahrhunderte und den Antheil Bayerns an derselben, eine Rede gehalten an dem 91 Stiftungstage der k. bayer. Akademie der Wissenschaften zu München am 28th März, 1850, von Dr. Coost Höfler. Munich, 1850, 4to. pamphlet. —By the Same.

Einige Worte über Wallensteins Schuld Fest-Rede gelesen in der öffentlichen Sitzung der kgl. Bayr. Akademie der Wissenschaften zu München zur Feier ihres ein und neunzigsten Stiftungstages am 28th März, 1850 von Dr. Rudhart. Munchen, 1850, 4to. pamphlet.—By the Same.

Abhandlung über das Schul- und Lehr-wesen der Mohammedaner im Mittelalter, von Dr. Daniel Hâneberg, Munich, 1850, 4to. pamphlet.—By the Same.

Bibidhártha Saũgraha, an illustrated Bengali periodical in the plan of the "Penny Magazine." No. I.—By Ba'bu Ra'jendrala'l Mittra.

Observations des Phenomènes Periodíques extraits du Tome XXV. des Memoires de l'académie Royale de Belgique, 4to.—By the Academy.

Zeitschrift der Deutschen morgenländischen Gesellschaft. Fünfter Band, 1 Heft.—By the Society.

Bulletin de la Societé de Geographie Troisième serie, Tome XIV.—By the Society.

Annual Report of the Grant Medical College, Bombay Session, 1850-51. Bombay, 1851, 8vo.—By the Secretary of the College.

Journal of the Indian Archipelago, for July and August.—By the Editor.

Ditto ditto, two copies.—By the Government of Bengal.

Memoirs of the Royal Astronomical Society, Vol. XIX. London, 1851, 4to.—By the Society.

Monthly Notices of the Royal Astronomical Society containing papers, abstracts of papers, and reports of the Proceedings of the Society from November, 1849, to June, 1850, Vol. X.—By the Society.

Proceedings of the Royal Irish Academy, Vol. IV.—By the Society.

Philosophical Transactions of the Royal Society of London for 1850, part II.—By the Society.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for August and September, 1851.—By the Deputy Surveyor General.

Tattwabodhiní Patriká, Nos. 97-8-9.—By the Tattwabodhini' Sobha'.

The Oriental Baptist, Nos. 57-8-9.—By the Editor.

Calcutta Christian Observer, for September and October, 1851.—By the Editors.

The Oriental Christian Spectator, for August, September and October, 1851.—By the Editor.

The Indian Charter, Nos. 1-2-3.—By the Editor.

Upadeshak, Nos. 57-8-9.—By the Editor.

Compte Rendus de l'ouvrage de J. A. Vullers intitulé: Institutiones Linguæ Persicæ cum Sanskrita et Zendica Lingua comparatæ, Par M. Garcin de Tassy. Pamphlet.—By the Author.

Satyárnab, for September and October, 1851.—By the Rev. J. Long.

Mortality and chief diseases of the Troops under the Madras Government, European and Native, from the years 1842-46, compared with those of 1847.—By Lieut.-Col. W. H. Sykes.

Citizen Newspaper for September and October.—By the Editor.

Purnachandrodaya, ditto for ditto.—By the Editor.

Exchanged.

Jamieson's Journal, No. 100.

London, Edinburgh, and Dublin Philosophical Magazine, for March, April and May, 1851.

Journal Asiatique, Nos. 79-80.

Athenæum, Nos. 12-35-36-37-38-39-40-41-42.

Calcutta Review, No. 30.

Purchased.

Edinburgh Review, No. 191.

North British Review, No. 29-30.

Annals and Magazine of Natural History, Nos. 43-4-5.

Journal des Savants, May, June and July, 1851.

Comptes-Rendus, Nos. 22-3-4-5-6.

Ra'jendrala'l Mittra.

December 2nd, 1851.

For December, 1851.

At a meeting of the Society held on the 3rd instant, at half-past 8 p. m.

Sir James Colvile, President, in the chair.

The Proceedings of the last meeting were read and confirmed.

Donations were received—

1st. From the Government of Bengal. Nos. 3 and 4 of the Selections from the Record of the Bengal Secretariat Office.

2nd. From Dr. A. Sprenger. A copy of his new edition of the Gulistan.

Capt. Thurburn and Capt. Layard, who had been duly proposed and seconded at the last meeting, were balloted for, and elected ordinary members.

The President submitted on the part of the Council the following report with reference to the notice which Dr. Sprenger had given at the last meeting, of his intention to bring forward, at this meeting, a motion to the effect that the Museum of the Society be offered to the Government for the formation of a Government Museum, and which had been by a resolution of that meeting referred to the Council.

Report.

"The Council having duly considered the motion of which notice was given by Dr. Sprenger at the last General Meeting and referred to this body for its consideration, is unanimously and decidedly opposed to the proposed offer of the museum to the Government."

Upon this, the Motion was withdrawn by Dr. Sprenger.

In conformity to a resolution of the Council, notice was given that they would propose at the approaching Annual General Meeting that the bye-Law No. 6 regarding the election of ordinary members be amended by striking out from it the word "eleven" and inserting *seven*.

Mr. Blyth read his report of progress made in the Zoological Department, during the month of November last.

The Council reported for the information of the meeting that they have granted to Mons. Garcin de Tassy, member of the French Academy, and to the Midnapore native Library, each a copy of the Bibliotheca Indica.

The President read an extract from a private letter from Major Kittoe requesting that the society would give to the Museum to be established at the new college at Benares, specimens of any thing Mineralogical, Entomological, Zoological, Fossil, Concological and curiosities, of which the Society may have duplicates to spare. Referred to the Council under the bye-laws.

Confirmed 7th January, 1852. J. W. Colvile, *President*.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of September, 1851.

Date.	Observations made at Sun-rise.						Maximum Pressure observed at 9h. 50m.						Observations made at Apparent Noon.					
	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind. Direction at Sun-rise.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind. Direction at 9h 50m.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind. Direction at Noon.	Aspect of Sky.
	Inches	°	°	°			Inches	°	°	°			Inches	°	°	°		
1	29.504	81.7	81.9	80.5	S. E.	Scattered-clouds	29.551	85.0	85.8	83.2	S. E.	Nimbi	29.532	86.0	87.0	83.6	S.	Cloudy
2	.539	82 0	82.1	81.2	S. E.	Cumulo-strati	.593	86.4	88.0	82.8	S. E.	Cumuli	.566	89 6	90,0	83,0	S. E.	Cumulo-strati
3	.565	81 8	81 8	80.9	S. E.	Cirro-strati	.630	86.5	87.6	83.6	S.	Cumulo-strati	.598	89.0	90.2	84.0	S.	Ditto
4	.567	82.0	82.2	81.4	S. E.	Raining	.587	83.8	86.2	83.8	S. S. E.	Cumuli	.560	88.3	89.2	83.8	S. S. E.	Cumuli
5	.617	81.0	78.0	76 8	S.	Ditto	.621	81.2	82.2	80.3	E.	Cloudy	.629	84.2	85.3	81.4	S.	Scattered-clouds
6	.637	80.3	80.6	80.0	E. S. E.	Cloudy	.666	84.3	85.4	82.7	E. S. E.	Cumulo-strati	.647	87.2	87.8	82.8	S. E.	Cumulo-strati
7S.	.558	82 9	82.9	81.8	S. W.	Cirro-strati	.575	87 0	87.5	82.8	E.	Ditto	.557	89.8	90.3	83.4	E.	Ditto
8	.466	82.8	82 8	81.8	N. E.	Cirro-cumuli	.525	86.9	88.2	82.4	N.	Cirro-cumuli	.470	90.2	91.2	82.4	E.	Ditto
9	.495	82.0	82 1	80.6	E.	Cumuli	.573	86.5	87.4	82.4	E.	Cloudy	.544	85 9	85 5	82 3	E.	Ditto
10	.547	81·2	81.3	80 0	E.	Ditto	.592	86.2	87.2	81.4	S. E.	Cumuli	.542	89.0	90.5	83 3	E.	Ditto
11	.526	82 8	83.0	82.0	W.	Cloudy	.594	84.4	84.8	81.3	N. E.	Cloudy	.569	85.0	85.0	82.0	N.	Cloudy
12	.612	79 2	79 2	78.2	S. S. E.	Raining	.693	82.8	82.6	80.2	S.	Ditto	.657	80.8	80.6	79.4	S.	Drizzly
13	.674	80.4	80.6	79 6	S. W.	Cirro-cumuli	.709	85.4	86.3	82 0	S. S. W.	Cumulo-strati	.673	88 5	89.0	82 3	S. S. W.	Cumulo-strati
14S.	.668	82.0	82.2	80.0	S.	Cirro-strati	.729	86.2	87.9	82.5	S. W.	Ditto	.696	89.0	89.9	82.8	S. W.	Ditto
15	.680	82.0	82,2	81.0	S.	Scattered-clouds	.741	85.5	86.0	81.3	S. S. W.	Ditto	.708	86.8	87.3	82.2	S. W.	Ditto
16	.688	81 8	82.0	80.4	S. W.	Cirro-cumuli	.761	86,2	87.7	82.2	S. W.	Ditto	.713	89.0	90.0	82.4	W.	Ditto
17	.712	82.6	82.8	81.4	S. S. W.	Ditto	.776	87.0	87.8	79.8	W.N.W.	Cirro-cumuli	.742	89.4	90.4	82 0	W.	Ditto
18	.725	83.2	83.6	82 4	S.	Cumuli	.777	87.6	88.4	82.7	S. W.	Cumulo-strati	.734	89.2	91.0	82.8	W.S. W.	Ditto
19	.756	81.3	81.6	80.6	E.	Cirro-strati	.796	85.2	84.0	81.2	N.	Raining	.762	87.0	87.3	81.7	N. W.	Ditto
20	.729	80 2	80.4	78.6	E. N. E	Ditto	.786	86.4	88.3	80.4	N.	Cumuli	.736	90.0	91.4	80.4	S. E.	Cumuli
21S.	.743	83.0	83.3	81.6	S. E.	Scattered-clouds	.797	87.3	88.4	82.0	S. E.	Cumulo-strati	.756	85.0	84.0	79.0	E.	Cumulo-strati
22	.771	82.8	83 2	81.7	W.	Cloudy	.837	86 5	88.0	82,8	W.N W.	Cirro-cumuli	.786	89.4	90.1	82 4	N. W.	Cumuli
23	.761	82 8	82.7	80.4	W.	Cirro-cumuli	.823	87.3	89.0	81.2	W.S. W.	Ditto	.780	88.7	88.7	83.8	S. W.	Cumulo-strati
24	.761	83,2	83,5	82.2	S. W.	Ditto	.798	88.2	89.3	82.0	S. W.	Cumulo-strati	.772	90 9	92.4	82.4	W.	Ditto
25	.803	83.7	84.2	82.7	S.	Ditto	.852	87.6	88.6	83.6	S. W.	Cirro-cumuli	.802	90.2	91.0	84.2	W.N.W.	Ditto
26	.832	81.6	81.6	80.2	S. S. E.	Cirro-strati	.887	87.3	88.8	82.2	N.	Cumuli	.843	90.3	91.0	81.3	E. N. E.	Cumuli
27	.773	83.0	83,3.	81.2	N.	Cumuli	.831	88.0	88.3	80.8	E.	Ditto	.776	90.0	89.8	80.2	E.	Ditto
28S.	.723	81.0	81.0	79.5	N. E.	Clear	.775	86.6	87.8	80,3	E.	Ditto	.724	89.7	90.4	81.6	N. E.	Cumulo-strati
29	.693	80.2	80 2	79.0	N. E.	Cirro-strati	.752	85.6	86.7	80,9	E.	Ditto	.715	89.0	90.0	81.4	E.	Ditto
30	.745	80 0	80.6	79.3	S. E.	Ditto	.779	86.2	87.2	81.2	S. E.	Cumulo-strati	.739	89.0	90.0	80.6	S. E.	Ditto
Mean	29.662	81.8	81.9	80.6	....	.....	29.714	86.0	87.0	81.9	....	.....	29.678	88 3	88.9	82.2	....	.....

[*Meteorological Register, continued.*]

Observations made at 2hs. 40m.						Minimum Pressure observed at 4 p. m.						Observations made at sun-set.						Maximum and Minimum Thermometer.				Rain Gauges. Elevations.		Moon's Phases	
Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind. Direction at 2h 40m p. m.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind. Direction at 4 p. m.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind. Direction at Sunset.	Aspect of Sky.	Max.	Mean.	Min.	Max. Therm. in Sun's rays.	Feet. 60. Upper	Feet. 5. Lower		Date.
Inches	°	°	°		.	Inches	°	°	°			Inches	°	°	°			°	°	°	°	Inch.	Inch.		
29.640	87.2	86.8	83.0	S.	Scatter'd-clds.	29.466	86.8	86.3	82.4	S. E.	Cloudy	29.483	85.0	84.1	81.5	S. E.	Cloudy	88.0	84.4	80.8	98.4	0.060	0.10		1
.502	90.4	90.6	83.0	S. E.	Cumulo-strati	.481	90.8	91.2	83.2	S. E.	Cirro-strati	.516	89.2	88.0	81.2	S.	Cirro-strati	91.4	86.5	81.4	107.0	..	0.22	D	2
.532	88.4	88.5	84.2	S.	Cloudy	.507	88.2	88.2	83.0	S.	Ditto	.524	88.5	87.9	83.5	S.	Ditto	91.0	86.0	80.9	107.0	0.330	0.38		3
.485	90.8	90.6	84.2	S. E.	Cumulo-strati	.491	89.0	88.2	84.8	S.	Cloudy	.520	86.1	85.3	82.0	S.	Cloudy	91.8	86.3	80.7	106.6	2.660	2.80		4
.554	86.6	86.7	83.3	S.	Cumuli	.545	87.2	86.6	82.4	SS.W.	Ditto	.568	85.3	85.3	82.8	SS.W.	Cirro-strati	88.3	83.0	77.7	107.8	0.570	0.63		5
.571	87.2	87.8	83.3	S.	Nimbi	.547	87.8	88.8	84.4	S.	Cumulo-strati	.557	86.3	86.0	83.0	S.	Ditto	89.0	84.2	79.4	102.0	0.100	0.14		6
.471	91.9	93.0	83.5	S. E.	Cumulo-strati	.453	88.0	86.0	83.1	S.	Ditto	.475	85.8	85.3	82.4	S.	Ditto	92.8	87.2	81.6	112.7	..	..		7
.406	92.4	93.0	83.3	E.	Ditto	.403	91.0	89.7	82.4	S. E.	Cloudy	.427	85.7	85.3	81.8	E.S.E.	Scattered-clds.	93.3	87.8	82.2	110.2	0.120	0.17		8
.478	86.4	87.5	83.4	E.	Ditto	.476	86.4	85.3	81.2	S. E.	Cumulo-strati	.496	86.3	86.0	81.0	S. E.	Ditto	88.0	84.7	81.4	99.8	0.220	0.27		9
.495	89.4	88.2	82.3	E.S.E.	Cloudy	.483	89.4	90.4	81.2	E.	Cirro-strati	.481	87.3	87.9	83.0	E.S.E.	Cirro-strati	90.7	85.5	80.2	108.8	0.105	0.16	○	10
.516	79.6	79.2	78.2	S.	Raining	.514	80.8	81.3	79.2	S. W.	Cloudy	.539	81.2	81.0	78.9	S.	Cloudy	85.8	84.0	82.2	90.0	1.975	2.08		11
.607	81.0	80.8	79.6	SS.W.	Ditto	.595	81.2	81.8	80.8	SS.W.	Ditto	.611	81.7	81.9	80.3	S.	Ditto	83.7	81.0	78.2	88.0	0.050	0.07		12
.614	89.0	88.7	83.0	S.	Cumulo-strati	.604	87.4	86.2	81.7	S.	Ditto	.625	84.2	84.9	81.0	S. W.	Ditto	90.2	85.0	79.8	101.7	..	..		13
.625	90.2	90.3	82.5	S.	Ditto	.617	90.2	90.0	82.0	S.	Cumulo-strati	.639	86.0	85.8	81.4	S.	Scattered-clds.	91.2	86.3	81.4	104.8	..	..		14
.645	89.4	89.8	83.4	S. W.	Ditto	.627	90.0	88.8	82.5	S.	Ditto	.663	86.0	85.0	81.3	S.	Cumulo-strati	91.2	86.4	81.5	107.6	..	..		15
.662	91.0	91.4	82.6	W.	Ditto	.648	91.6	92.0	83.2	W.	Ditto	.681	87.0	86.2	81.6	S.	Scattered-clds.	92.3	86.8	80.4	103.8	..	..		16
.683	90.6	90.6	81.4	W.	Ditto	.676	90.4	89.6	81.0	S. W.	Cloudy	.679	87.0	86.2	82.1	W.	Cumuli	92.0	87.1	82.2	106.3	..	..		17
.678	88.7	87.2	82.4	S.	Cloudy	.673	86.6	86.0	80.4	ENE.	Ditto	.695	84.2	84.1	79.5	S. E.	Cloudy	91.8	87.3	82.8	105.6	0.205	0.25	☾	18
.676	90.4	91.8	82.0	N. E.	Cumulo-strati	.654	91.2	91.7	81.4	N. W.	Cumulo-strati	.702	85.2	83.9	79.8	S.	Cumulo-strati	91.8	86.3	80.8	109.8	..	..		19
.666	92.0	92.0	80.8	S. E.	Ditto	.664	91.0	89.8	82.6	N. E.	Ditto	.692	85.1	83.5	80.0	S. E.	Cloudy	92.7	86.2	79.7	112.0	..	..		20
.688	87.3	87.3	82.0	N. E.	Cloudy	.681	86.8	86.0	81.2	N.	Cloudy	.734	85.0	84.4	81.8	S.S.E.	Ditto	88.7	85.8	82.8	97.0	..	..		21
.710	92.3	92.3	82.0	N. W.	Cumulo-strati	.692	91.8	91.0	82.3	N. W.	Cumulo-strati	.728	88.0	87.4	81.7	S. E.	Scattered-clds.	93.2	87.7	82.2	106.8	0.140	0.16		22
.710	92.4	93.0	81.8	N.	Ditto	.692	93.0	93.3	81.2	N. W.	Clear	.704	90.3	89.0	81.7	N.	Cirro-strati	93.3	87.7	82.0	112.5	..	..		23
.699	93.4	93.5	82.3	W.	Ditto	.688	93.8	94.2	83.0	S. W.	Cumulo-strati	.713	91.5	90.0	83.2	W.	Ditto	94.8	88.7	82.6	106.4	..	..		24
.756	87.3	84.0	78.5	S. E.	Raining	.746	84.3	83.8	79.3	ENE.	Cloudy	.766	84.0	84.2	79.0	E.S.E.	Cloudy	91.7	87.5	83.2	107.0	..	..	●	25
.767	91.4	91.6	81.3	E.	Cumulo-strati	.747	92.0	92.0	82.0	E.S.E.	Cirro-strati	.760	89.8	89.4	82.7	S.	Cirro-strati	92.6	86.7	80.7	107.7	..	..		26
.696	90.2	90.0	81.0	N. E.	Ditto	.691	90.2	90.0	80.4	E.	Cloudy	.716	87.5	87.1	80.2	E.	Ditto	91.0	86.8	82.6	105.7	..	..		27
.676	85.6	81.0	79.0	S. E.	Raining	.683	81.7	81.4	79.2	N.	Raining	.677	81.6	81.4	79.0	E.	Cloudy	91.7	86.0	80.2	108.0	0.305	0.34		28
.646	91.0	90.6	80.7	N.	Nimbi	.661	87.0	84.8	80.3	S.	Cloudy	.662	81.8	82.0	79.7	S. W.	Cirro-strati	91.6	85.4	79.2	109.3	0.665	0.72		29
.644	91.3	91.5	80.6	S. E.	Cumuli	.625	91.4	91.4	80.2	E.S.E.	Cirro-strati	.645	89.5	88.4	82.2	SS.W.	Ditto	91.9	85.8	79.6	111.5	..	..		30
29.617	89.2	89.0	82.0	....	.....	29.601	88.6	88.2	81.7	....	.....	29.623	86.1	85.6	81.3	....	.....	90.9	86.0	81.0	105.4	7.305	8.49		

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of October, 1851.

Date.	Observations made at Sun-rise.						Maximum Pressure observed at 9h. 50m.						Observations made at Apparent Noon.					
	Bar. red. to 32° F.	Temperature.			Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature.			Wind.	Aspect of Sky.	Bar. red. to 32° F.	Temperature.			Wind.	Aspect of Sky.
		Of Mer.	Of Air.	W. Bulb.	Direction at Sun-rise.			Of Mer.	Of Air.	W. Bulb.	Direction at 9h 50m.			Of Mer.	Of Air.	W. Bulb.	Direction at Noon.	
	Inches	°	°	°			Inches	°	°	°			Inches	°	°	°		
1	29.703	82.4	82.8	81.4	S. W.	Cloudy	29.732	86.3	86.6	82.0	S. W.	Cirro-cumuli	29.706	90.3	91.2	81.3	S. E.	Cirro-cumuli
2	.738	81.8	82.3	81.0	S.	Cirro-strati	.791	87.6	88.7	82.0	S.	Cumulo-strati	.752	90.0	90.4	81.6	S.	Cumulo-strati
3	.771	82.3	82.6	81.4	S.	Cumuli	.815	86.6	86.8	81.5	S. W.	Ditto	.741	89.6	89.0	82.0	S. W.	Ditto
4	.690	81.8	81.7	79.0	N.	Cirro-strati	.735	85.4	86.0	80.8	N. N. W.	Ditto	.660	89.0	90.7	82.7	N. N. W.	Ditto
5S.	.625	77.4	77.4	75 9	S.	Cloudy	.674	79.0	80.2	77.4	N. E.	Cloudy	.606	84.3	85.2	80.4	N. E.	Ditto
6	.662	78.3	78.3	77.6	S. S. E.	Raining	.746	79.4	79.8	78.4	S. S. E.	Drizzly	.713	83.2	84.0	79.6	S. E.	Nimbi
7	.798	78.2	78.2	77.6	S. E.	Cloudy	.857	82.7	83.6	80.6	S. E.	Cloudy	.819	85.2	85.2	80.4	S. E.	Cloudy
8	.804	78.2	78.0	76.5	E. S. E.	Scattered-clouds	.861	83.6	84.3	79.6	E. S. E.	Cumulo-strati	.804	85.0	83.6	80.2	E. S. E.	Nimbi
9	.795	79.0	79.2	78.3	S.	Drizzly	.841	85.0	85 6	80.4	S.	Ditto	.801	85.4	86.7	81.2	S.	Cumulo-strati
10	.835	79.0	79.0	78.0	S. E.	Cumulo-strati	.880	83.0	84.3	80 3	S. S. W.	Cumuli	.836	86.0	86.0	80.4	S. S. W.	Nimbi
11	.871	78.4	78.6	78.0	S.	Cumuli	.910	84.7	86.0	80.2	S. E.	Cumulo-strati	.859	87.4	88.4	81.4	S. S. W.	Cumulo-strati
12S.	.823	79.0	79.3	78.4	S.	Clear	.871	85.3	86.6	81.2	S. E.	Ditto	.818	86.7	86.6	81.3	S. W.	Ditto
13	.724	79 0	79.2	78.0	S. E.	Ditto	.804	84.0	84.4	79.5	N. W.	Ditto	.750	87.0	87.0	79.6	E.	Ditto
14	.724	78.8	79.0	78.4	E.	Ditto	.787	85.3	86.4	80.9	E. S. E.	Ditto	.749	87.6	88.0	81.0	E. S. E.	Ditto
15	.814	79.4	79.6	79.2	E. S. E.	Generally-clear	.877	85.0	86.8	81.6	S. S. E.	Ditto	.832	85 8	83.8	79.4	S.	Raining
16	.858	79.4	79 6	78.7	S.	Clear	.917	84.3	85.2	79 3	S. W.	Cumuli	.884	86.7	88.0	80 9	S. W.	Cumuli
17	.878	79 4	79.5	78.4	S.	Ditto	.916	84.6	85.0	79.8	S. W.	Cumulo-strati	.889	86.6	86.6	80.3	S. W.	Cumulo-strati
18	.854	79.5	79.8	78.8	S. E.	Cirro-strati	.916	85.3	87.0	79.9	N. E.	Ditto	.851	88.9	89.4	80.0	N. E.	Ditto
19S.	.868	78 2	78.3	77.3	E.	Scattered-clouds	.922	83.3	83.6	79.0	E.	Ditto	.863	85.0	85.6	79.3	E. N. E.	Ditto
20	.849	77.4	77.4	75.8	N. E.	Cloudy	.884	80 2	80.6	76.5	E. N. E.	Ditto	.819	82.4	82.6	78.0	N. E.	Cloudy
21	.777	77.0	76.6	75.6	E.	Drizzly	.819	80.6	81.3	78.5	E.	Cloudy	.776	81.7	77.8	75.7	S. E.	Raining
22	.752	76.4	76.8	76.0	N. E.	Cloudy	.806	78.0	78.7	77.4	N. E.	Ditto	.765	77.0	75.5	74.0	N. E.	Ditto
23	.564	76.2	76.0	75.3	N. E.	Raining	.520	75.4	76.0	75.2	N. E.	Raining	.475	76.4	76.6	75.3	N.	Ditto
24	.705	75.4	75.6	74.4	N. W.	Cloudy	.771	79.0	80.0	76.3	W.	Cumulo-strati	.730	81.8	83.0	78.0	W.	Cumulo-strati
25	.791	77.6	77.8	77.3	S.	Clear	.863	82.7	84.3	77.3	S.	Clear	.819	85.3	86.2	76.8	S. W.	Clear
26S.	.905	75.4	75.7	75.2	S.	Ditto	.955	81.8	83.8	79.0	S.	Ditto	.919	84.9	85.9	79.9	S. W.	Ditto
27	.989	75.0	75.4	74.5	W. S. W.	Ditto	30.044	81.4	82.8	75.6	S. W.	Ditto	30.001	84.0	85.0	76.2	S. S. W.	Ditto
28	30.031	73.7	74.0	72.8	S. W.	Ditto	.066	79.7	81.2	72.0	W.	Ditto	.012	83.0	84.3	70.7	S. W.	Ditto
29	29.995	72.0	72.3	70.7	S. S. E.	Ditto	.042	80.5	81.8	73 7	S. S. W.	Ditto	29.990	83.5	84.3	74.0	S.	Ditto
30	.999	73.0	73.0	71.5	S.	Ditto	.045	80.0	81.3	72.9	S. E.	Ditto	30.000	83.0	83.9	73.4	S. E.	Ditto
31	30.018	70.5	70.4	68.8	N.	Ditto	.075	76.7	78.0	73.2	N. E.	Ditto	.030	80.6	81.7	74.2	S.	Cumuli
Mean	29.810	77.7	77.8	76.8	....	.....	29.863	82.5	83.5	78.5	....	.....	29.815	84.9	85.2	78.7	....	.....

[Meteorological Register, continued.]

Observations made at 2h. 40m.						Minimum Pressure observed at 4 p. m.						Observations made at sun-set.						Maximum and Minimum Thermometer.				Rain Gauges. Elevations.		Moon's Phases	Date.
Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind. Direction at 2h 40m p. m.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind. Direction at 4 p. m.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind. Direction at Sunset.	Aspect of Sky.	Max.	Mean.	Min.	Max. Therm. in Sun's rays.	Feet. 60. Upper	Feet. 5. Lower		
Inches	°	°	°			Inches	°	°	°			Inches	°	°	°			°	°	°	°	Inch.	Inch.		
29.670	91.8	92.0	82.2	S. W.	Cirro-cumuli	29.653	89.3	87.4	80.4	S.	Cirro-cumuli	29.674	87.4	86.0	80.2	S.	Cirro-cumuli	92.5	87.4	82.2	107.5	..	..		1
.671	91.4	91.5	82.6	S.	Cumulo-strati	.675	90.7	90.2	82.0	S.	Cumulo-strati	.700	88.6	87.9	82.4	S.	Cirro-strati	92.2	86.7	81.2	106.8	..	..	☽	2
.684	91.0	91.4	82.4	S. W.	Ditto	.670	91.8	90.0	81.8	S. W.	Ditto	.681	86.7	86.0	81.3	N. E.	Ditto	92.6	87.3	82.0	106.0	..	..		3
.584	90.4	91.4	82.4	N.	Ditto	.576	91.3	91.3	82.4	NNW	Ditto	.586	89.0	88.4	82.3	N.N.W.	Ditto	92.2	86.6	81.0	105.2	0.965	1.00		4
.535	85.0	84.0	79.2	N. E.	Ditto	.534	83.6	93.0	79.6	N. W.	Cloudy	.546	82.3	81.8	78.4	N.	Cloudy	86.9	80.9	74.8	104.8	1.055	1.10		5
.666	81.5	81.7	78.8	S. E.	Raining	.664	81.4	81.7	78.3	S. E.	Ditto	.696	81.4	81.5	78.8	S. E.	Ditto	84.7	81.0	77.2	91.3	0.490	0.52		6
.748	84.0	84.2	80.6	S. E.	Ditto	.745	83.0	82.4	80.3	SS.W.	Raining	.764	81.2	80.8	79.2	S. E.	Nimbi	86.3	81.8	77.2	97.7	0.065	0.09		7
.738	87.0	86.4	80.6	S.	Cloudy	.725	85.4	85.2	80.8	S.	Cloudy	.726	83.8	83.3	80.2	S. E.	Scattered-clds.	88.2	82.5	76.8	103.6	..	..		8
.742	86.8	87.6	81.3	S.	Cumulo-strati	.734	87.2	86.6	81.2	S.	Cumulo-strati	.772	85.0	84.3	80.2	S.	Cirro-strati	88.4	83.3	78.2	105.8	0.245	0.27		9
.793	81.6	81.4	78.4	S.	Ditto	.788	81.8	81.8	78.6	S.	Ditto	.802	82.3	82.0	79.7	S. E.	Cumuli	86.8	82.4	78.0	101.4	0.155	0.19	⊙	10
.812	81.8	82.8	80.2	S.	Cloudy	.806	84.0	84.3	80.8	SS.W.	Ditto	.808	83.3	83.2	80.8	S. E.	Cumulo-strati	89.0	83.5	77.9	105.2	0.225	0.29		11
.733	89.2	88.2	80.7	S.	Cumulo-strati	.734	87.0	86.8	81.2	S.	Ditto	.729	85.4	84.8	80.8	S.	Cirro-strati	90.0	84.1	78.2	106.8	..	..		12
.682	84.3	84.4	80.0	N. E.	Cirro-cumuli	.671	86.2	85.6	78.2	N. E	Ditto	.692	84.5	84.0	80.2	E.	Cloudy	88.0	83.1	78.2	104.8	..	..		13
.713	83.3	84.6	80.6	S.	Nimbi	.712	82.0	79.5	77.3	E.	Raining	.736	80.4	80.7	79.4	S. E.	Ditto	88.6	83.4	78.1	101.4	0.495	0.53		14
.784	85.2	85.8	81.8	S.	Cumulo-strati	.774	87.7	87.8	81.6	SS.W.	Cumulo-strati	.799	86.0	85.0	80.8	S.	Cumulo-strati	88.5	83.6	78.7	107.4	..	..		15
.813	89.0	88.9	81.2	S. W.	Cumuli	.791	89.0	88.2	80.4	S.	Clear	.812	86.2	85.3	81.0	S.	Clear [to East	89.8	84.2	78.6	104.3	..	..		16
.786	89.4	90.0	80.4	S.	Cumulo-strati	.782	90.0	90.0	80.3	S. W.	Ditto	.825	87.5	86.6	81.2	S. W.	Cumulo-strati	90.5	84.6	78.6	107.4	..	..		17
.807	84.5	78.8	76.3	S. E.	Raining	.791	83.2	82.5	78.8	S.	Cirro-strati	.808	82.0	81.4	78.4	S.	Cirro-strati	90.4	84.6	78.7	108.3	0.310	0.34	☾	18
.798	83.3	84.0	79.0	N. E.	Cumulo-strati	.806	82.2	81.2	78.6	N. E.	Cloudy	.831	80.0	79.0	76.0	E.NE.	Cloudy	87.0	82.1	77.2	103.2	0.105	0.13		19
.855	81.4	79.0	77.0	N. E.	Raining	.751	80.0	79.2	77.4	S. E.	Ditto	.759	79.0	78.6	76.6	S. E.	Scattered-clds.	85.0	80.6	76.2	99.6	0.820	0.86		20
.719	78.0	78.6	77.0	E.S.E.	Cloudy	.710	79.3	80.0	77.8	E.S.E.	Ditto	.722	79.2	79.0	76.6	S. E.	Cloudy	83.7	79.5	75.2	94.6	0.625	0.70		21
.692	75.0	75.3	74.7	N. E.	Raining	.667	75.5	76.2	75.3	N. E.	Drizzly	.663	75.6	76.2	75.3	N. E.	Raining	78.8	75.9	72.9	..	over flu.	10.12		22
.488	77.2	78.0	75.8	N.	Cloudy	.515	77.5	77.6	75.7	N.	Raining	.555	77.8	78.0	75.6	N.N.W.	Cloudy	78.0	75.4	72.8	..	0.085	0.11		23
.662	85.2	86.0	78.5	W.	Cumuli	.668	85.6	85.8	78.2	W.NW.	Cumulo-strati	.679	84.6	83.8	78.5	S.	Cirro-strati	86.0	79.4	72.7	98.5	..	..		24
.774	87.2	87.4	76.4	S. W.	Clear	.764	87.0	86.3	78.0	S.SW.	Clear	.812	84.8	83.8	78.4	S.	Clear	87.5	82.1	76.6	105.2	..	..	●	25
.860	86.8	87.4	78.0	SS.W.	Ditto	.866	86.7	85.3	77.4	S. W.	Ditto	.883	84.5	82.9	78.8	SS.W.	Ditto	87.7	81.0	74.2	105.5	..	..		26
.947	86.5	86.6	76.6	W.	Ditto	.947	86.3	86.0	76.2	W.	Ditto	.965	85.0	84.3	77.6	S.	Ditto	87.3	80.8	74.2	103.3	..	..		27
.952	85.8	85.9	71.7	S. W.	Ditto	.943	85.6	84.8	72.8	S.	Ditto	.944	82.8	81.8	74.9	S. W.	Ditto	86.4	79.6	72.8	102.7	..	..		28
.933	85.6	85.8	75.4	S. W.	Ditto	.921	85.0	84.5	73.6	S. W.	Ditto	.924	83.2	82.1	75.4	S. W.	Ditto	86.4	78.8	71.2	101.7	..	..		29
.925	85.3	85.2	73.4	S.	Ditto	.929	85.0	84.0	73.0	S.S.E.	Ditto	.944	83.2	82.1	75.0	S. W.	Ditto [to East	86.0	78.9	71.8	104.0	..	..		30
.967	84.2	84.6	75.2	W.	Cumuli	.968	84.3	83.3	74.0	NNE	Ditto	.983	82.6	82.3	74.5	N. W.	Cumulo-strati	85.4	77.6	69.8	98.7	..	..		31
29.759	85.7	85.1	78.7	....	.....	29.751	85.0	84.5	78.5	....	.....	29.768	83.4	82.8	78.7	....	.....	87.4	82.0	76.6	103.2	..	16.25		

...great Register kept at the Surveyor General's Office, Calcutta, for the Month of November, 1851.

Date.	Observations made at Sun-rise.						Maximum Pressure observed at 9 h. 50 m.						Observations made at Apparent Noon.					
	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind. Direction at Sun-rise.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind. Direction at 9h.50m.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind. Direction at Noon.	Aspect of Sky.
	Inches	°	°	°			Inches	°	°	°			Inches	°	°	°		
1	30.039	72.0	72.0	70.2	N.	Clear	30.067	79.5	81.4	74.2	N.	Clear	30.008	83.2	84.7	74.4	N. N. E.	Clear
2S.	.037	72.6	72.8	70.4	N. E.	Cirro-strati	.067	80.2	81.6	73.0	E.	Cirro-strati	.004	83.6	84.6	74.0	N. N. E.	Cirro-strati
3	29.938	74 3	74.5	71 4	N.	Cirro-cumuli	29.979	79.0	80.5	75 0	N.	Cirro-cumuli	29.927	81.3	82.0	74.3	N. W.	Cirro-cumuli
4	.879	73 3	73 0	70.0	N.	Cirro-strati	.908	79.4	80.8	71.5	N.	Cirro-strati	.854	83.2	83.8	72.0	N.	Cirro-strati
5	.913	71.6	71.5	68.4	N.	Ditto	.961	79.0	80.8	71.5	N.	Clear	.904	83.0	84.0	71.7	N. W.	Clear
6	.900	70.4	70.0	67.0	N.	Ditto	.940	76.4	78 2	70.9	N. N. E.	Cirro-strati	.879	81.4	83.2	72.2	N.	Cirro-strati
7	.900	70.4	70 2	67.0	N.	Ditto	.952	77.6	79.2	70.2	N.	Ditto	.893	81.3	82.3	70.4	N. W.	Ditto
8	.874	72.6	72.6	69.0	N. N. E.	Ditto	.924	78.6	80.4	71.3	N.	Ditto	.885	80.6	82.0	72.8	N.	Ditto
9S.	.916	71 0	71.2	68.4	N.	Ditto	.964	76.3	77.4	71.4	N. W.	Ditto	.901	81.4	82.0	72.2	N. W.	Clear
10	.957	71.3	71.2	68.2	N.	Cirro-cumuli	30.019	77.8	79.2	70.8	N. E.	Cirro-cumuli	.976	81.5	82.5	72.8	N.	Ditto
11	.960	71.0	70.5	67.8	N.	Clear	.014	76.3	77.9	69.6	N. W.	Clear	.959	80 3	82.0	70.0	N. N. W.	Ditto
12	.916	70 8	70.7	68 3	N.	Ditto	29.967	78.3	80.4	69.9	N.	Ditto	.915	81.4	83.4	70.6	N.	Ditto
13	.945	69.8	70 0	67.8	N.	Ditto	.997	77.3	79 2	70.0	N. W.	Ditto	.945	81 0	82.8	71.6	N. W.	Ditto
14	.981	65.4	65 4	62 8	N.	Ditto	30.010	73 3	75.2	65 0	N. W.	Ditto	.953	77 6	79.2	65.3	N. W.	Cirro-strati
15	.975	64.3	64.6	63.0	Calm	Cirro-strati	.027	72.0	75.4	66 4	N.	Cirro-strati	.968	77.0	78.4	66.4	E.	Ditto
16S.	.960	65.0	65.0	63.8	Calm	Clear	29.989	73.2	75.8	67.0	N. W.	Clear	.937	77.5	79.9	68.8	N. E.	Clear
17	.925	67.0	67 2	65.8	Calm	Cirro-strati	.963	75.0	77.2	71.2	N.	Ditto	.908	80.2	82.3	72.3	N.	Cirro-strati
18	.942	71.2	71.2	69.2	E.	Cirro-cumuli	.988	77.2	79.0	71.7	N. E.	Cirro-cumuli	.939	81.2	82.2	73.2	N. E.	Cirro-cumuli
19	30.011	67.6	67.4	63.4	N. E.	Clear	30.060	75.4	78.0	66.5	N. E.	Clear	30.003	81.0	83.0	69.8	N.	Clear
20	29.982	65.0	65.2	62.4	N.	Ditto	.031	72 0	73 9	66.8	W. N. W.	Ditto	29.968	77.2	79 2	69.2	W. N. W.	Ditto
21	.961	67.6	67.6	65.0	W.	Cirro-cumuli	.007	72.8	74 5	65.4	N. W.	Ditto	.951	77.4	79.2	67.0	N. W.	Ditto
22	.899	68.5	68.3	67 3	N. W.	Foggy	29.947	74 4	76.5	69.3	N. W.	Ditto	.879	79.0	80.2	69.7	W.	Ditto
23S.	.831	67.9	68.0	66.3	S. W.	Cirro-cumuli	.879	75.5	78.5	70.5	S.	Ditto	.821	80.5	82.4	70.6	S.	Ditto
24	.896	72.7	73.2	72 4	S.	Foggy	.954	75.4	76 6	74.5	N. W.	Hazy	.906	80.3	82.4	75.6	N. N. W.	Cumuli
25	.950	68.2	67.8	63.8	N.	Clear	30 021	73.6	75.4	67.0	N.	Clear	.957	77.5	79.0	68.0	N. W.	Clear
26	.989	66.0	65.9	62.8	N. N. W.	Cumuli	.053	71.3	72.5	65.0	N.	Ditto	.990	76.4	77.8	68.2	N.	Cumuli
27	.999	65.4	65.0	61.3	N. N. W.	Ditto	.038	71.2	73.2	65.0	N.	Ditto	.980	76.8	78.5	69.5	N.	Clear
28	.965	66 0	65.2	61.4	N. N. W.	Cirro-strati	.021	71.3	73.6	65.8	N.	Ditto	.969	77.4	79 8	70.2	N.	Ditto
29	.979	67.0	66.5	62.2	N. N. W.	Clear	.039	71.8	74.3	66.2	N.	Ditto	.987	78.0	80.3	70.2	N.	Ditto
30S.	30 008	69 5	69.5	63.4	N.	Cloudy	.066	71.1	71.9	65.5	N.	Cloudy	30.007	73.6	75.9	67.9	N. N. W.	Cloudy
Mean	29.947	69.2	69.1	66.3	....	.....	29.995	75.4	77.3	69.3	....	.....	29.939	79.7	81.0	70.7	....	.....

[*Meteorological Register, continued.*]

Observations made at 2h. 40m.						Minimum Pressure observed at 4 p. m.						Observations made at sun-set.						Maximum and Minimum Thermometer.			Max. Therm. in Sun's rays.	Rain Gauges. Elevations.		Moon's Phases	Date.
Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind. Direction at 2h 40m p. m.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind. Direction at 4 p. m.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind. Direction at Sunset.	Aspect of Sky.	Max.	Mean.	Min.		Feet. 60. Upper	Feet. 5. Lower		
Inches	°	°	°			Inches	°	°	°			Inches	°	°	°			°	°	°	°	Inch.	Inch.		
.946	86.3	86.0	74 0	N.	Clear	29.944	85.4	85.0	74.5	N. W.	Cumuli	29.960	83.6	82.2	74.6	N. W.	Clear	86 6	79.0	71.4	101.4	..	..	D	1
.943	83 5	83.3	73 8	N. W.	Cumulo-strati	.932	83.6	83.3	73.6	N. W.	Cirro-cumuli	.934	81.5	81 0	74.9	N. W.	Cloudy	86.0	79.1	72.1	100.4	..	..		2
.857	83.5	84.0	73 6	NNW	Cirro-cumuli	.849	83.4	83 0	73.7	N. W.	Ditto	.855	82.3	81.3	74.8	N. W.	Cirro-strati	84.8	79.1	73.4	96.6	..	..		3
.814	85.5	85.7	72.4	N.	Cirro-strati	.806	85.0	84.3	72.2	N.	Ditto	.820	82.6	81.8	73.4	N. W.	Cirro-cumuli	86.3	79.3	72.2	100.4	..	..		4
.861	85 2	85.4	71.3	N. W.	Clear	.856	84.6	83.8	71 2	NNW	Clear	.864	82.4	81.3	72 2	NNW	Clear	86.0	78.4	70.7	100.5	..	..		5
.843	83.5	84.2	72.5	NNW	Cirro-strati	.833	83.6	83 0	72.1	N. W.	Cirro-strati	.842	81.7	80.4	72.5	NNW	Cirro-strati	85.0	77.1	69.2	101.6	..	..		6
.846	83.8	84.3	72.2	N.	Ditto	.845	82.0	82.0	71.3	NNW	Cirro-cumuli	.857	80.6	80.0	72.3	N. W.	Cloudy	85.0	77.1	69.2	100.4	..	..		7
.849	82.0	81.4	71.4	N. W.	Cloudy	.841	80.5	80.0	71.2	N.	Cloudy	.848	77.8	77.8	70.5	N.	Ditto	84.2	78.1	72.0	93.7	..	..		8
.849	83.4	84.5	73 8	N.	Cirro-strati	.850	82.8	82.0	72.2	NNW	Cirro-cumuli	.864	80.3	79.4	70.8	N.	Cirro-cumuli	85.0	77.4	69.8	100.6	..	..	☉	9
.919	84 4	85.0	73.6	N.	Clear	.911	83 6	82.8	71.4	N.	Clear	.920	81.6	80.4	71.3	N.	Clear	85.6	77.9	70.2	99.7	..	..		10
.906	84 0	84.6	71.4	N. W.	Ditto	.892	83.7	83.3	70.3	N.	Ditto	.898	81.6	80.4	71.0	N.	Ditto	85.4	77.6	69.7	98.7	..	..		11
.860	84.7	85.3	71.6	N.	Ditto	.848	84 0	83.0	70 6	N.	Ditto	.857	81.5	80.3	70.7	N.	Ditto	86.0	77.9	69.7	99.5	..	..		
.875	84 3	84.5	69.8	NNW	Ditto	.868	83 0	81.6	66.5	N.	Ditto	.881	79.2	78.0	67.0	N.	Ditto	85.0	77.0	69.0	97.8	..	..		
.875	80.4	80.4	64.4	w.s w.	Cirro-strati	.878	79.4	78.7	64.2	NNW	Cirro-strati	.878	77.3	75.5	67.1	W.	Cirro-strati	81.3	72.9	64.5	93.2	..	..		
.903	80 3	80.6	69.0	N. W.	Ditto	.902	79.4	78.4	68 0	N. W.	Ditto	.898	77.0	76.2	69.8	w.s w.	Ditto	81.7	72.7	63.6	95.6	..	..		15
.868	81.2	82 2	71.0	E.	Clear	.865	80.5	79.8	69.6	E.	Clear	.872	78.6	77.6	70.7	E.	Clear	82.7	73.6	64.4	99.0	..	..		16
.846	83.8	83.8	72.3	N.	Cirro-strati	.844	83.0	82 2	72.0	NNE.	Cirro-cumuli	.847	81.5	80.5	72.6	NNE.	Cirro-cumuli	84.8	75.5	66.2	102.3	..	..	☾	17
.877	83.4	84.4	73.0	N.	Cirro-cumuli	.872	83 0	82.7	72.4	N.	Ditto	.882	81.2	80.0	72.0	N.	Ditto	84.6	77.5	70.4	100.5	..	..		18
.920	84.0	84.0	69.5	N.	Clear	.923	82.2	81.2	68 3	N.	Clear	.920	80.0	78.4	69.5	N.	Clear	85.0	75.8	66.5	97.6	..	..		19
.884	81.6	82.2	68.8	N. W.	Ditto	.871	80 6	80.0	66 9	N. W.	Ditto	.872	78.6	77.0	69.5	N. W	Ditto	83.0	73.6	64.2	95.4	..	..		20
.876	81.0	81.0	69.0	W.	Ditto	.870	80.0	79.3	68 4	W.	Ditto	.870	78.2	77.0	69.5	N. W	Cirro-strati	82.4	74.6	66.7	93.5	..	..		21
.814	82 2	82.6	71.0	N. W.	Cumuli	.813	80.7	80.0	70.2	N. W.	Cumuli	.826	78.0	78.0	70 6	N. W.	Ditto	83.4	75.3	67.2	95.8	..	..		22
.776	84.0	84.0	72.7	S.	Cirro-cumuli	.780	83.4	83.0	73 2	SS.W.	Cirro-cumuli	.788	82.0	81.4	73 3	S. E.	Clear	85.3	76.0	66.6	100.4	..	..	●	23
.844	84 6	85.0	72.0	NNW	Cumuli	.840	83.3	82.2	70.4	NNW	Cumuli	.840	81.6	80.0	71 8	NNW	Cumuli	85.1	78.2	71.2	100.6	..	..		24
.890	80.7	80.8	67.6	NNW	Clear	.888	79.5	78.5	67.0	NNW	Clear	.902	77.0	76.0	67.2	NNW	Clear	81.7	74.3	66.9	93.6	..	..		25
.911	80.4	80.8	69.5	NNW	Cumuli	.904	79.3	78.5	68.7	NNW	Ditto	.906	77.3	76.9	68.5	NNW	Ditto	81.6	73.3	65.0	93.0	..	..		26
.903	81.0	81.3	70.6	NNW	Cirro-strati	.886	80 2	79.6	69.6	N.	Cirro-strati	.885	78.4	77.5	70.4	NNW	Cirro-strati	82.4	73.3	64.2	95.4	..	..		27
.899	82.2	82.6	70 4	N.	Clear	.894	81.2	80.6	69.4	N.	Clear	.903	79.2	78.4	70.3	N.	Clear	83.5	73.9	64.2	96.0	..	..		28
.927	81.3	82.8	70.8	N.	Cirro-strati	.920	81.0	80 6	69.8	N.	Cirro-strati	.929	79.2	78.5	70.0	N.	Cirro-strati	83.0	74.3	65.5	97.9	..	..		29
.933	80.9	81.6	70.4	N.	Clear	.930	80.0	79.8	69.0	NNW	Clear	.939	78.3	77.6	70.2	NNW	Clear	82.4	75.3	68.2	95.0	..	..	D	30
.877	82.9	83.3	71.1	....	.....	29.872	82.6	81.4	70.3	....	.....	29.879	80.0	79.0	71.0	....	.....	84.2	76.2	68.1	97.9	0.00	0.00		

Meteorological Register kept at ..e Surveyor General's Office, Calcutta, for the Month of December, 1851.

Date.	Observations made at Sun-rise.						Maximum Pressure observed at 9 h. 50 m.						Observations made at Apparent Noon.					
	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind. Direction at Sun-rise.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind. Direction at 9h 50m.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind. Direction at Noon.	Aspect of Sky.
	Inches	°	°	°			Inches	°	°	°			Inches	°	°	°		
1	29.988	65.6	65.4	62.8	N.	Clear	30.043	72.0	74.2	67.5	N.	Clear	29.986	77.0	78.6	67.2	N.N.W.	Clear
2	.964	62.9	62.9	60.2	N.N.W.	Ditto	.033	70.0	72.2	65.3	N.N.W.	Ditto	.972	75.6	77.6	66.0	N.N.W.	Ditto
3	30.007	64.0	63.9	61.2	N.	Ditto	.058	71.2	73.3	65.4	N.	Ditto	.999	76.0	77.8	66.2	N.	Cirro-strati
4	29.988	63.3	62.6	59.6	N.N.W.	Ditto	.083	68.5	70.4	62.4	N. W.	Ditto	30.029	73.2	75.2	62.9	N.N.W.	Clear
5	30.029	59.4	59.0	56.3	N.	Ditto	.085	65.5	67.6	58.0	N.	Ditto	.021	72.0	73.4	58 3	N. W.	Ditto
6	.041	55.0	55.2	53.4	Calm	Ditto	.113	63.2	65.9	56.0	N. W.	Ditto	.055	70.2	72.2	59.2	N. W.	Ditto
7S.	.067	55.6	55.2	53.0	Calm	Ditto	.114	63.5	66.4	59.2	N. W.	Ditto	.050	69.5	71.4	60.0	N. W.	Ditto
8	.009	56.8	56.2	53.4	N. W.	Ditto	.059	63.0	65.3	57.7	N. W.	Ditto	29.987	70.0	72.8	62.5	N. W.	Ditto
9	29.992	57.0	56.4	53.4	Calm	Ditto	.056	63.4	66.0	57.4	W.	Ditto	.997	70.2	72.5	60.6	N. W.	Ditto
10	30.056	56.0	55.8	53.4	Calm	Ditto	.124	63.5	66.2	58.0	N. W.	Ditto	30.066	71.0	73.0	59.9	N.N.W.	Ditto
11	.100	58.3	57.6	54.4	N.N.W.	Ditto	.147	64.6	67.4	58.4	N.	Ditto	.092	71.0	73.4	61.3	N.N.W.	Ditto
12	.083	56.8	56.5	53.4	N.N.W.	Ditto	.138	63.4	66.0	57.8	N.N.W.	Ditto	.084	70.2	72.0	61.8	N.N.W.	Ditto
13	.091	57.6	57.6	55.4	W.	Cirro-strati	.126	65.6	69.0	62.8	N. W.	Ditto	.077	72.7	75.0	65.4	W.N.W.	Ditto
14S.	.079	61.2	61.0	58.4	Calm	Ditto	.129	68.8	72.2	64.6	N.	Ditto	.059	74.8	77.0	66.3	N.	Ditto
15	.048	61.5	61.0	59.6	Calm	Clear	.107	69.0	71.4	64.2	N.	Ditto	.048	73.7	75.6	65.8	N.	Ditto
16	.041	61.0	61.0	59.8	Calm	Ditto	.088	68.0	70.4	64.3	N.N.W.	Ditto	.026	74.0	76.2	66.2	N. W.	Ditto
17	.025	61.7	61.8	60.4	Calm	Ditto	.084	70.0	73.0	64.6	N. W.	Ditto	.027	75.2	77.3	67.4	N. W.	Ditto
18	.041	65.3	65.4	64.8	Calm	Foggy	.088	69.3	72.3	68.3	W.S.W.	Ditto	.023	75 0	76.9	69.0	W.	Cumuli
19	.004	63.6	63.7	62.4	Calm	Clear	.048	70.4	73.4	68.8	S. W.	Cumuli	.013	75.0	77.0	69.4	W.	Cumulo-strati
20	.026	62.6	62.8	61.2	Calm	Ditto	.097	69.0	71.8	65.2	N. E.	Clear	.043	75.0	77.0	67.3	N.N.E.	Cumuli
21S.	.049	62.5	62.7	61.2	Calm	Ditto	.102	70.2	72.8	65.1	N.N.W.	Cumuli	.049	75.2	77.4	67.0	N.N.W.	Ditto
22	.031	64.0	64.2	63.2	N. W.	Cumuli	.078	70.2	72 3	67.8	N. W.	Clear	.022	75.4	77.5	67.2	S. W	Ditto
23	.020	65.5	65.2	64.6	Calm	Foggy [strati	.088	67.8	69.9	67.3	N.	Ditto	.040	74 2	76.6	65.4	N. W.	Clear
24	.030	62.7	62.4.	61.3	W.N.W.	Fogs and Cirro-	.074	68.0	70 2	63.2	W.	Cirro-strati	.016	73.4	74.6	62.0	W.	Cirro-strati
25	.033	60.4	60.5	57.3	N. W.	Clear	.092	67 0	69.3	61.6	N. W.	Clear	.036	74.6	76.6	62.8	N.N.W.	Clear
26	.073	59.5	59.2	57.3	N.	Ditto	.118	67.3	70.2	63.4	N. W.	Ditto	.054	73.2	75.2	63.7	N. W.	Ditto
27	.017	58.0	58.0	56.6	Calm	Ditto	.065	66.0	68.8	59.5	N. E.	Ditto	.009	72.0	74.2	62.6	W.N.W.	Ditto
28S.	.028	58.3	58.0	57.0	Calm	Ditto	.068	66.4	69.4	62.0	N. E.	Ditto	.009	72.0	74.0	62.4	N.N.W.	Ditto
29	.047	56.4	56.6	54.8	Calm	Foggy	.117	64.4	68.2	58.4	E. S. E.	Ditto	.056	73.0	75.4	63.5	W.	Ditto
30	.075	57.7	57.6	56.0	Calm	Clear	.115	66.0	69.4	62.0	W.	Ditto	.046	72.4	75.0	63.4	N. W.	Ditto
31	.033	58.0	58.2	56.5	Calm	Ditto	.072	67.3	70.0	61.0	E. N. E.	Ditto	.014	72.4	75.0	64.0	N.N.W.	Ditto
Mean	30.036	60.3	60.1	58.1	....	.....	30.091	67.2	69.8	62.5	....	.....	30.032	73.2	75.3	64.1	....	.....

[*Meteorological Register, continued.*]

Observations made at 2h. 40m.						Minimum Pressure observed at 4 p. m.						Observations made at sun-set.						Maximum and Minimum Thermometer.				Rain Gauges. Elevations.		Moon's Phases	Date.
Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind. Direction at 2h 40m p. m.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind. Direction at 4 p. m.	Aspect of Sky.	Bar. red. to 32° F.	Temperature. Of Mer.	Of Air.	W. Bulb.	Wind. Direction at Sun-set.	Aspect of Sky.	Max.	Mean.	Min.	Max. Therm in Sun's rays.	Feet. 60. Upper	Feet. 5. Lower		
Inches	°	°	°			Inches	°	°	°			Inches	°	°	°			°	°	°	°	Inch.	Inch.		
29.912	80.7	80.6	67.7	N. W.	Clear	29.905	79.2	78.4	66.6	N. W.	Clear	29.912	76.9	75.5	68.0	NNW	Clear	81.6	73.0	64.4	95.3	..	..		1
.896	79.4	80.0	66.4	N. W.	Ditto	.891	78.3	77.9	65.5	NNW	Ditto	.892	76.3	75.5	67.0	NNW	Ditto	80.6	71.1	61.6	91.7	..	..		2
.940	80.0	80.4	66.4	N. W.	Ditto	.943	78.3	77.3	64.3	N. W.	Cirro-strati	.953	76.0	74.5	65.8	w.s w.	Ditto	81.0	71.9	62.8	93.6	..	..		3
.967	77.4	77.4	63.4	w.s w.	Ditto	.971	76.0	75.2	62.4	NNW	Clear	.978	73.4	72.0	64.2	w.s w.	Ditto	78.3	70.2	62.1	89.2	..	..		4
.948	75.6	76.2	59.8	N.	Ditto	.941	74.4	73.7	68.8	NNW	Ditto	.952	72.2	70.8	60.0	NNW	Ditto	76.6	67.1	57.6	90.0	..	..		5
.983	75.0	75.8	60.8	NNW	Ditto	.980	73.8	73.0	59.0	NNW	Cirro-strati	.993	71.4	69.8	60.4	N. W.	Cirro-strati	76.4	65.0	53.6	88.0	..	..		6
.967	74.5	75.3	60.4	N. W.	Ditto	.962	73.4	73.0	59.6	N. W.	Clear	.974	71.0	70.0	61.3	N. W.	Clear	75.8	64.9	54.0	87.3	..	..		7
.929	75.3	76.4	64.0	N. W.	Ditto	.926	74.3	73.6	64.0	N. W.	Ditto	.934	72.0	69.4	62.6	N. W.	Ditto	77.0	66.1	55.2	89.8	..	..	☉	8
.922	75.0	75.8	61.8	NNW	Ditto	.917	73.7	73.2	60.6	N. W.	Ditto	.933	71.3	70.0	61.4	N. W.	Ditto	76.5	67.0	55.4	89.6	..	..		9
30.009	75.7	76.2	60.8	NNW	Ditto	30.009	74.4	74.0	69.2	NNW	Ditto	30.021	72.0	70.0	60.4	NNW	Ditto	77.0	65.9	54.7	91.0	..	..		10
.021	76.0	77.0	61.6	NNW	Ditto	29.997	75.8	74.3	59.4	NNW	Ditto	.017	72.3	71.2	59.6	NNW	Ditto	77.2	66.9	56.5	89.5	..	..		11
.010	75.4	76.3	64.0	NNW	Ditto	30.017	74.4	73.7	62.4	N. W.	Ditto	.028	70.8	70.0	63.2	NNW	Ditto	77.2	66.2	55.2	89.4	..	..		
.009	77.3	78.0	67.0	S. W.	Ditto	29.996	76.3	75.6	65.7	E.	Cirro-strati	.011	73.2	71.4	65.5	Calm	Cirro-strati	78.8	67.5	56.2	93.7	..	..		
.014	78.4	79.0	67.3	N. E.	Cumuli	30.007	76.7	76.2	65.0	NNW	Clear	.007	74.3	72.8	67.2	Calm	Clear	79.5	69.8	60.0	93.4	..	..		
29.973	78.0	78.3	66.2	w.nw.	Clear	29.971	76.6	76.0	64.9	w.s w.	Ditto	29.977	74.4	73.4	66.4	Calm	Ditto	79.3	69.7	60.0	92.6	..	..	☾	15
.953	78.7	79.3	66.8	NNW	Ditto	.953	77.4	77.0	66.2	NNW	Ditto	.961	75.0	74.0	67.2	N. W.	Ditto	80.0	69.9	59.8	91.3	..	..		16
.952	79.3	79.3	67.6	W.	Cumuli	.947	77.8	77.4	67.3	S. W.	Cumuli	.960	75.4	74.4	68.2	Calm	Cumuli	80.5	70.6	60.7	94.5	..	..		17
.952	78.6	78.4	68.7	S. W.	Cumulo-strati	.936	77.2	77.2	67.2	WSW	Ditto	.948	75.4	74.4	69.2	N.	Clear	79.8	71.8	63.8	92.5	..	..		18
.945	77.4	78.0	68.4	N. W.	Ditto	.926	77.3	76.8	66.6	NNW	Ditto	.944	75.2	74.0	66.8	N.	Cumuli	79.5	71.0	62.5	92.5	..	..		19
.973	79.0	79.5	68.6	N. W.	Cumuli	.962	77.6	77.0	66.6	NNW	Clear	.972	75.5	74.3	66.4	N. W.	Clear	80.4	71.0	61.5	92.7	..	..		20
.973	78.8	79.2	67.9	w.s w.	Ditto	.967	77.4	76.6	66.4	w.s w.	Cumuli	.976	75.6	74.8	67.4	W.	Ditto	80.3	70.9	61.4	91.4	..	..		21
.960	78.4	79.6	69.0	S. W.	Ditto	.946	77.2	76.8	67.4	S. W.	Ditto	.961	75.2	74.2	68.2	S. W.	Ditto	79.8	71.0	62.2	93.7	..	..		22
.981	78.2	78.9	66.4	N. W.	Ditto	.966	77.0	76.4	65.0	SS.W.	Clear	.975	75.0	73.8	66.8	W.	Ditto	79.0	71.5	64.0	91.6	..	..	●	23
.934	76.3	77.4	62.4	W.	Clear	.931	75.8	75.2	62.2	N. W.	Ditto	.942	73.4	72.0	64.2	NNW	Ditto	77.7	69.5	61.2	87.7	..	..		24
.979	77.4	77.9	62.8	w.s w.	Ditto	.971	76.2	75.6	62.4	N. W.	Ditto	.997	73.7	72.7	63.0	N. W.	Ditto	78.3	68.6	58.9	89.7	..	..		25
.999	76.0	76.6	63.6	NNW	Ditto	.991	75.0	74.5	62.3	N. W.	Ditto	.991	72.8	71.6	63.8	W.	Ditto	77.2	67.7	58.2	87.8	..	..		26
.957	76.2	76.6	62.4	W.	Ditto	.947	75.0	74.4	60.8	W.	Ditto	.954	72.6	71.0	62.6	W.	Ditto	77.6	67.3	57.0	92.4	..	..		27
.940	76.5	77.2	61.5	w.sw.	Ditto	.940	75.6	75.0	61.3	w.s w.	Ditto	.942	72.7	71.2	62.7	w.s w.	Ditto	77.8	67.5	57.2	92.2	..	..		28
30.004	76.4	77.5	62.4	N. W.	Ditto	.992	75.5	75.0	62.3	N. W.	Ditto	30.004	72.7	71.4	63.7	N. W.	Ditto	78.2	66.6	55.0	90.8	..	..		29
29.979	76.6	77.8	63.3	N. W.	Ditto	.961	76.0	75.4	62.2	NNW	Ditto	29.967	73.6	72.0	63.2	N. W.	Ditto	78.3	67.3	56.0	89.6	..	..	☽	30
.934	77.0	77.0	64.3	NNW	Ditto	.926	76.5	75.9	64.1	NNW	Ditto	.940	73.4	72.3	65.2	NNW	Ditto	78.3	67.6	56.9	90.0	..	..		31
29.965	77.2	77.9	64.6	....	.....	29.958	76.1	75.5	63.5	....	.....	29.968	73.7	72.4	64.6	....	.....	78.6	68.8	58.9	91.1	0	0		